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Economic, Educational and Conservation Benefits of Sea Turtle Based Ecotourism: A Study Focused on Mon Repos

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Clem Tisdell and Clevo Wilson

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By

Clem Tisdell† and Clevo Wilson‡

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† Professor of Economics, The University of Queensland, 4072, Australia.

‡ Postdoctoral Fellow, Department of Economics, The University of Queensland, 4072, Australia.

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For more information write to Professor Clem Tisdell, Department of Economics, University of Queensland, Brisbane 4072, Australia.

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ABSTRACT

The study examines the economic, educational and conservation values of sea turtle-based ecotourism in Australia. The centre-piece of this research is a case study undertaken at the Mon Repos Conservation Park located near the town of Bundaberg, Queensland. Each year from mid-November to end of March, thousands of visitors visit Mon Repos Conservation Park to view sea turtles either nesting on the one km stretch of beach or to see hatchlings emerge from their nests and march on to the sea or both. As a result of this activity there are considerable economic benefits to the Bundaberg region during the sea turtle season. The study examines the economic impact of sea turtle viewing at Mon Repos to the region. The study assesses the recreational value of sea turtle viewing. Furthermore, sea turtle-based ecotourism also provides educational and conservation benefits which are important for the protection and conservation of sea turtles, especially in Australia. The study specifies the extent of the educational impact and conservation appreciation of sea turtle viewing at Mon Repos Conservation Park. As a background to the study, Mon Repos visitors' profile and socio-economic data of visitors are provided. In order to conduct this study, 1,200 survey forms were distributed, out of which 519 usable responses were obtained.

CHAPTER 1

BACKGROUND

All species of sea turtles are threatened with extinction (IUCN, 1996) primarily due to the activities of humans. Threats to sea turtles are detailed in Environment Australia (1998). Marine turtles are victims of human developments of various kinds such as human encroachments on their breeding grounds, damage or death at sea due to boat strikes and fishing activities, death due to ingestion of wastes such as plastics or other pollutants and entanglement in floating ropes and other human-originating flotsam and jetsam. Indigenous communities in the Indo-Pacific also harvest sea turtles for meat and consume their eggs. Turtles are still taken for the souvenir market and despite bans by CITES (Convention on International Trade in Endangered Species), some trade in tortoiseshell (bekko in Japan) obtained from hawksbill turtles *Eretmochelys imbricata*, still continues.

The problem of conserving sea turtles is compounded by the fact that they are highly migratory. Those species which breed in Australia, for example, travel to many other countries in the Indian and Pacific oceans. Consequently, they are a transboundary international resource[1]. Loggerhead turtles *Caretta caretta* breeding at Mon Repos beach near Bundaberg in Southern Queensland travel to several other Pacific countries, e.g. New Caledonia, Solomon Islands and Papua New Guinea (Queensland Turtle Research, 1994, p.48) where they may be eaten by indigenous people. The leatherback turtles *Demochelys coriacea* which are found in Australian waters may even travel as far afield as Mexico (Limpus, 1988, p. 66). Although Australia contains important breeding grounds (rookeries) for six species of sea turtles, the conservation of the populations of sea turtles associated with these rookeries is only partially under Australian control. This does not mean that Australian efforts to conserve sea turtles will be of no avail, but indicates that international cooperation is needed to enhance the effectiveness of these efforts.
Queensland, Australia's second largest state, is situated in tropical and sub-tropical waters and contains internationally important habitats for sea turtles, especially for their breeding. Several policies have been adopted in Queensland in recent years to improve the chances of survival of sea turtles. These include limitations on boat speeds when boats are near turtles in marine areas and required avoidance procedures and more recently, the fitting of turtle-excluding devices on prawn trawlers. Non-indigenous persons may not kill or capture turtles nor collect their eggs, although indigenous Australians (Aborigines and Torres Strait islanders) may do so for non-commercial purposes (GBRMPA, 1994, p.3). In addition, turtle-based ecotourism is playing a role in Queensland's strategy to help conserve sea turtles.

The main purpose of this study is to provide economic estimates of the value of sea turtle-based tourism and to estimate the economic potential for the development of such tourism in Australia. This study also aims to determine the educational and conservation values of sea turtle-based tourism. The Mon Repos case study is the centre-piece of this research. However, the report also provides some background material on the non-consumptive recreational values of wildlife with comparisons, sea

[1] For example, 90% of the nesting green sea turtles in the Australasian region occurs within Australia. But approximately 90% of the harvest occurs outside Australia (Limpus, 1988, p.64).

turtles as an asset for tourism, the Australian status of turtles, threats to their populations globally and general aspects of the problems associated with the sustainability of non-consumptive wildlife tourism, especially sea turtle-based tourism. The project proposal for funding is attached in Annexure A of Chapter 1.

1.1 Tourism/ecotourism as a contributor to conservation of sea turtles

Tourism can either have positive or negative effects on the conservation of turtles depending on its nature. Tourism which has occurred in Malaysia, for example, has been destructive of turtles (Heng and Clark, 1991, pp. 33-36). Lights from tourist resorts and cars in the vicinity of turtle rookeries are likely to disorientate newly hatched turtles which instead of marching to the sea on emergence move inland to their death. Furthermore, shade on beaches from tall buildings associated with tourist development can result in failure of turtle eggs to incubate successfully because of lack of warmth. Harassment of turtles by tourists can also interfere with their nesting. Consequently, tourists and their activities need to be controlled if they are to be without negative consequences for turtle populations. On the other hand, tourism can have positive consequences for the conservation of sea turtles if it is appropriately managed as at Mon Repos Conservation Park.

Turtle-based tourism at this park fulfills the conditions for ecotourism (Tisdell, 1996): it is conducted in a manner careful of the environment, provides education about sea turtles, and is designed to make visitors aware of conservation problems facing turtles and informs visitors of ways in which they can help conserve marine turtles.

The fact that such tourism is sustainable and brings extra income and employment to the local community helps to foster local regional support for such conservation efforts.

In the Bundaberg region, the sea turtles have become a regional icon. A sea turtle has been included in the coat of arms of the Burnett Shire Council. The Bundaberg District Tourism and Development Board (responsible for the general marketing of tourism in the region) also uses a turtle-image to help promote tourism in its region. Furthermore, a Turtle Festival was commenced in 1999.

Ecotourism may also help to promote communal solidarity. Ecotourism, especially that involving animal watching, is frequently highly labour-intensive and often relies on local volunteers to make it viable from an economic point of view. In the case of the turtle rookery at Mon Repos, local volunteers assist officers of the Queensland Parks and Wildlife Service (QPWS) in a variety of ways, e.g. collection of entrance fees, operating a small souvenir shop, assisting with crowd control, organising viewing-parties and collecting scientific data about turtles. Such participation helps to build local support for turtle conservation and avoids economic costs which would be likely to cripple the tourism operation. A similar pattern has been observed for other ecotourism ventures e.g. the Royal Albatross rookery at Taiaora Head in New Zealand (Tisdell, 1990).

The long-term conservation of species is dependent on local political support as well as wider community support. Programmes at Mon Repos are fostering both as is apparent from the survey of visitors to Mon Repos Conservation Park.

Mon Repos Conservation Park is located on the coast near Bundaberg in central Queensland, north of the coastal township of Bargara. Mon Repos beach, about 1km in length supports the 'largest concentration of nesting marine sea turtles on the eastern Australian mainland and is one of the two largest loggerhead turtle rookeries in the South Pacific Ocean region' (Kay, 1995, p. 3)[2]. The breeding that takes place here is vital for the survival of loggerheads *Caretta caretta* in the region. Flatbacks *Natator depressus*, and greens *Chelonia mydas*, too, visit Mon Repos but in low numbers. In addition to these three species, the giant leatherbacks *Demochelys coriacea* occasionally nests at Mon Repos and on beaches north of Mon Repos. Data maintained by QPWS show that on average 183 loggerheads, 6 flatbacks and 2 green sea turtles were recorded during the last 4 years at Mon Repos. Table 1.1 gives a breakdown of species and numbers seen at Mon Repos during these years.

TABLE 1.1: NESTING SEA TURTLES AT MON REPOS FOR THE LAST FOUR SEASONS

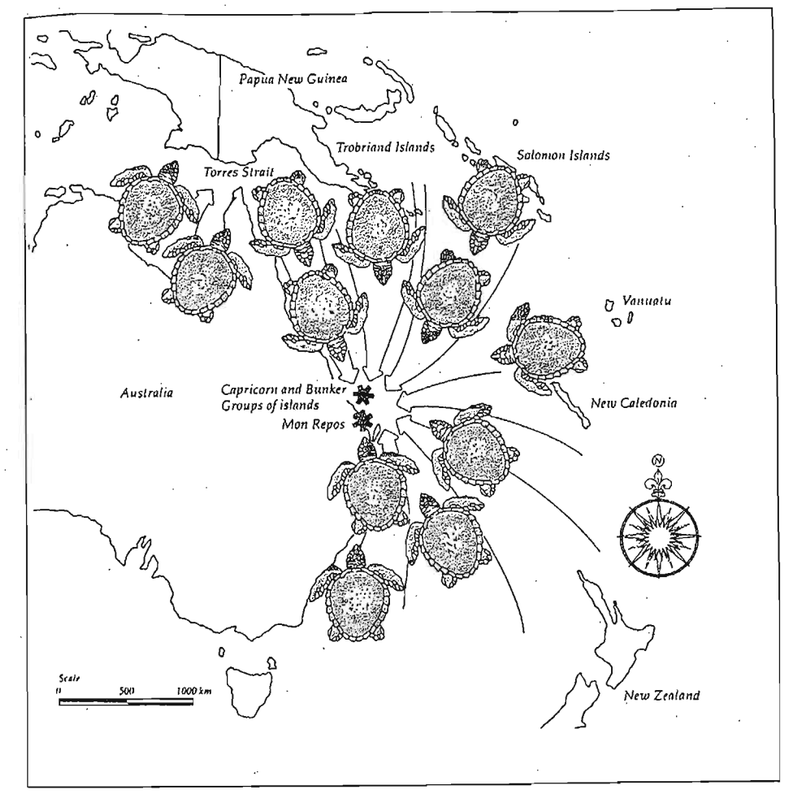
Season	Species		
	Loggerhead	Green	Flatback
1996/7	198	2	4
1997/8	119	1	8
1998/9	262	2	7
1999/2000	152	3	4

Source: Queensland Parks and Wildlife Service, 2000 (unpublished data)

Each year, female sea turtles travel thousands of kilometres from their feeding grounds to nest at Mon Repos. Figure 1.1 shows the directions from which female loggerhead sea turtles travel to converge in Mon Repos. These route patterns have been recorded as a result of tagging undertaken over the years by staff of the QPWS. As Figure 1.1 and data maintained by QPWS show, many sea turtles that nest at Mon Repos cross international borders and are thus exposed to several threats, both, man-made as well as natural. They are known to travel from far away places such as Indonesia, New Caledonia, Vanuatu, Solomon Islands or as close as Hervey Bay (Australia). It is widely believed that sea turtles that nest in Mon Repos are those that hatched on the same beaches many decades ago.

[2] Loggerheads make up 95% of all nesting sea turtles along the Bundaberg coast. Green sea turtles, the most numerous nesters in the southern Great Barrier reef, make up less than 1% of turtles nesting on Bundaberg beaches. Flatback turtles make up less than 4-5% of nesting turtles along the Bundaberg coast and are only found in Australian waters (Kay, 1995).

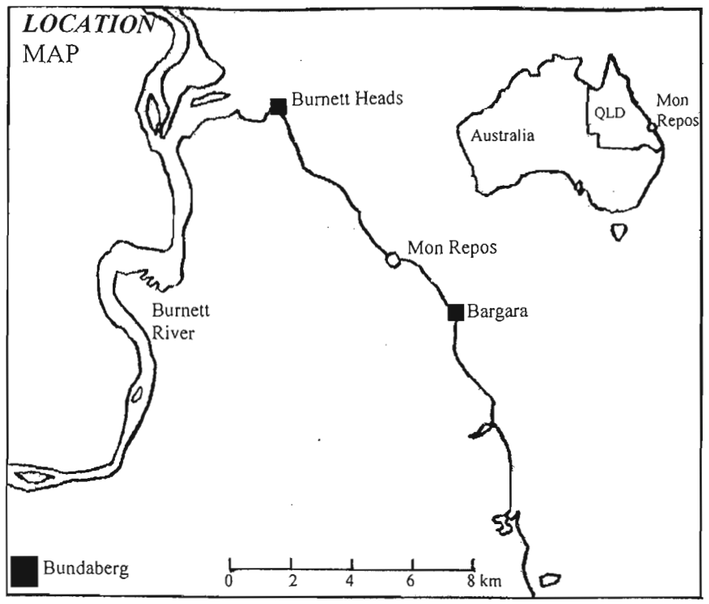
FIGURE 1.1: SEA TURTLES MIGRATING TO NEST IN MON REPOS



Source: Queensland Department of Environment and Heritage (1994), p. 56.

Mon Repos is the most accessible sea turtle rookery in Australia for tourists and its general location is indicated in Figure 1.2.

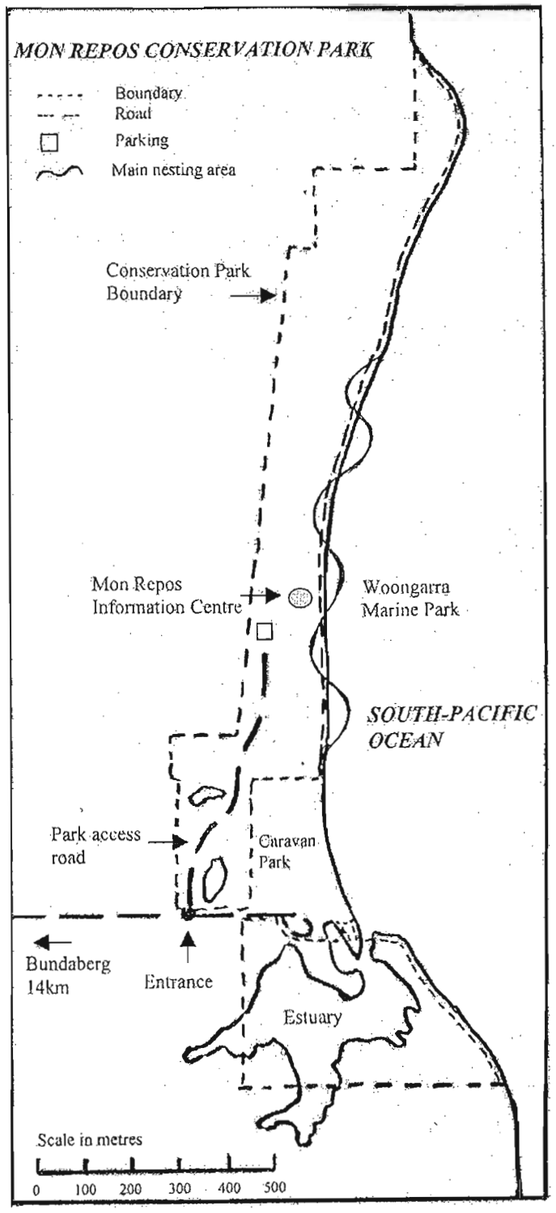
FIGURE 1.2: MAP SHOWING THE GENERAL LOCATION OF MON REPOS



Source: Kay, 1995, p.1.

The landward boundary of the Park is critical to preventing potential suburban development along the coastline which could have fatal consequences for this rookery. Indeed, there was an imminent threat of such development in the 1980s which led the Queensland Government embarking on a programme to acquire parcels of its freehold land abutting Mon Repos beach and this eventually culminated in the Conservation Park. Casuarinas (she-oaks) were planted by QPWS along the foreshore to reduce light from the leeward side. The Mon Repos Conservation Park and its environs is shown in Figure 1.3.

FIGURE 1.3: SITE MAP OF MON REPOS CONSERVATION PARK AND ITS ENVIRONS



Sea turtle viewing at Mon Repos dates back to the early part of the 1900s but was only a local event (Kay, 1995). The following were important steps in the development of the site for ecotourism.

- 1968, Queensland Turtle Research Programme commenced at Mon Repos with the support of a Brisbane-based tertiary education institution with Dr Colin Limpus providing leadership.
- 1981, initial steps towards establishment of Mon Repos Conservation Park; first parcel of land acquired to establish Mon Repos Environmental Park.
- 1985, formal turtle-watching programme commenced by research staff at Mon Repos in order to manage growing crowds.
- 1991, Woongarra Marine Park declared in order to protect sea turtles offshore from Mon Repos (and nearby beaches) during their breeding season.
- 1993-94, Information Centre and Amphitheatre completed at Mon Repos Conservation Park in order to enhance the educational impact of turtle watching.
- 1994-95, Season service fee introduced; marks the commencement of commercialized ecotourism at the Park.

Mon Repos Conservation Park today is the prime focal point for sea turtle-based tourism in mainland Australia. Sea turtle viewing is also conducted in Western Australia in Exmouth and elsewhere but on a smaller scale. On the islands of the Great Barrier Reef, sea turtle viewing is one of the islands major attractions. Some of the major Queensland island sea turtle rookeries include: Heron, Wreck, Raine, Bountiful and Milman islands.

Mon Repos Conservation Park is managed by QPWS. Use of the beach by the public is restricted during the nesting season. Visitors are taken to the beach to view sea turtles at night under guidance of QPWS rangers and volunteers. Each group consists of not more than 70 persons. The use of torches is restricted and visitors are guided so as to have minimal adverse impact. An interpretative program is conducted by QPWS staff on the beach to explain the egg laying process of sea turtles and hatchling behaviour. The display centre and audio-visual presentations provide further information on sea turtle nesting behaviour, life history, migration, biology, evolution, sea turtle research and conservation.

Turtle watching at Mon Repos is seasonal. The season begins in mid-November and continues until the end of March of the following year. There are three phases in that period: in the earlier part, only egg laying activities can be observed, in the second phase both egg laying and hatchling emergence can be observed and in the final phase only emergence of hatchlings can be seen. But all of these phases have their attractions to tourists.

1.2 The purpose of the study

In the last two decades, non-consumptive wildlife-oriented recreation (NCWOR) tourism has recorded phenomenal growth popularized by ecotourism. The economic potential for exploiting wildlife resources in a non-consumptive manner is, therefore, undoubtedly large as studies have demonstrated (Fillion et al., 1983; Hoyt, 1996; Davis and Tisdell, 1998). Such tourism offers a realistic chance for the conservation of wildlife resources in the long term. This is especially important when wildlife

resources are dwindling due to habitat destruction, poaching and other human actions. By showing a sustainable tourism economic value for wildlife resources, habitat destruction, poaching and other threats may be reduced. Such tourism activities can also be educational. Non-consumptive economic values show the opportunity costs of current consumptive uses (e.g. meat, eggs) and incidental destruction (e.g. from boat strikes, entanglement in prawn trawls and crab pots) of sea turtles. Given the opportunity costs involved in such activities it can become practical to apply economic instruments to improve conservation management of sea turtles and justify legal sanctions. Furthermore, non-consumptive economic values provide a strong argument for inter-governmental efforts to curb the large-scale harvesting of eggs and turtles for their meat and tortoiseshells in neighboring countries. A field study was carried out in Mon Repos to show the potential for exploiting sea-turtle-based ecotourism in a specialized niche market to obtain economic, educational and conservation benefits, that is, to explore the non-consumptive values, including recreational values of sea turtles. For a general discussion of non-consumptive recreational value of wildlife oriented tourism with comparisons, sea turtles as an asset for tourism, the Australian status of turtles, threats to their populations globally and general aspects of the problems associated with the sustainability of non-consumptive wildlife tourism, especially sea turtle-based tourism, see Annexure B of Chapter 1).

1.3 Objectives of the study

- To determine the economic, educational and conservation values of sea turtle-based tourism.
- To determine how much visitors are willing to pay for sea turtle conservation in Australia.
- To determine the recreational value of sea turtle viewing.
- To examine the potential and further development of sea turtle-based ecotourism in Australia and elsewhere.
- To examine the non-consumptive use appeal of sea turtle viewing and demonstrate the potential that exists for nature-based tourism in Australia.

The first three objectives were addressed partly on the basis of a survey of visitors to Mon Repos.

1.4 Methodology

In order to determine the economic, educational and conservation values of sea turtle–based ecotourism at Mon Repos a detailed questionnaire was developed. The questionnaire was subdivided into two main sections. Part I of the questionnaire was to obtain background information on the visitors current visit to watch sea turtles at Mon Repos and the costs involved with the trip to Bundaberg and Mon Repos. Socio-economic data were also obtained. Part II of the questionnaire included collecting data on educational aspects, conservation appreciation of sea turtle viewing and economic valuation questions. The questionnaire is attached in the Annexure to Chapter 2.

Random sampling techniques were used to obtain the data from visitors to Mon Repos Conservation Park. The survey was conducted from December, 1999 to end of

March, 2000 by volunteers and rangers of the QPWS attached to Mon Repos. Approximately 15 questionnaires per day were randomly distributed to visitors at the entrance and/or while awaiting their turn to watch sea turtles. During the 4-month survey, 1,200 questionnaires were distributed, out of which **519** usable responses were received by us for the analysis in this report. The response rate was 43 percent. These 519 responses correspond approximately to the same number of visiting groups so that responses from about 10% of visiting groups during the 1999/2000 season was obtained. Completed survey forms could either be left with rangers or volunteers at Mon Repos or returned to us in a post-paid envelope.

Prior to the survey, a pilot study was conducted in November, 1999. A total of 25 responses were obtained. This enabled us to check out the viability of the questions prepared to collect the necessary data. As a result, the questionnaire was modified, removing questions that proved difficult to administer and the number of questions were also reduced.

ANNEXURE A TO CHAPTER 1

A.1 SEA TURTLES AND ECOTOURISM: A STUDY FOCUSSED ON MON REPOS

Preamble

The main purpose of this study is to provide economic estimates of the value of turtle-based tourism in the Mon Repos area and to estimate the economic potential for the development of such tourism. The Mon Repos case study is the centerpiece of this research. However, in the report which is to be prepared some background material will be provided on sea turtles generally as an asset for tourism and threats to their populations globally, the Australian status of turtles and general aspects of the use of turtles for tourism in Australia. The educational and conservation values of sea turtle-based tourism will also be assessed.

Aims of the Mon Repose case study

1.1 To determine the demand for turtle-based tourism at Mon Repos.
1.2 To estimate the reliance of local tourism on the presence of turtles.
1.3 To determine the economic benefits and costs to the community of turtle conservation.
1.4 To complete an economic impact analysis on the local community of expenditure attributable to the presence of turtles (this will involve, for instance, account being taken of tourism multipliers).
1.5 To estimate the direct and indirect values of turtle-based tourism and conservation, paying particular attention to the non-consumptive value of turtles. This involves total economic valuation.
1.6 To identify benefits other than those mentioned above from encouraging eco-tourism based on sea turtles, e.g. other financial benefits plus educational and conservation benefits in relation to turtle-conservation awareness.

1.7 To explore and suggest methods to encourage and expand turtle-based tourism at Mon Repos and elsewhere.
1.8 To identify ways in which tourism can be developed in harmony with turtle conservation, for example, some account maybe taken of carrying capacity, zoning and so on in relation to turtle conservation.
1.9 To explore the sustainability aspects of turtles in relation to tourism.

Justification

2.1 No study has been carried out to date to determine the demand for turtle-based tourism nor has the non-consumptive use-value (both direct and indirect) been estimated. Mon Repos is ideal because of its size (and relative nearness) for a scoping study. A further advantage is that at present guided walks are conducted by park wardens and volunteers to watch turtles and their egg-laying spectacle.
2.2 We are starting with a well-focused study in a particular area to enable quality research to be completed and to act as a pilot for any further research which might be done elsewhere.
2.3 It is hoped that this research would be a precursor to future in depth studies which might be conducted elsewhere.

Methods

3.1 In order to estimate the demand, a questionnaire will be administered to visitors of Mon Repos from November, 1999 to March, 2000 during the turtle nesting period and emergence of turtle hatchlings from their nests at Mon Repos. Travel cost data will be collected and willingness to pay values will be listed. Contingent valuation will be applied.
3.2 Prior to this, information will be collected from tourist businesses in the Mon Repos area and discussions will be held with officials such as those of the National Parks and Wildlife Services and the Local Council in order to obtain the value of their information and advice.
3.3 Where business or authorities are able to provide us with secondary data, such as financial statements or details of visitors' numbers and so on, we shall certainly make use of this. We shall also approach the tourist organisations for possible regional tourist data.
3.4 We are awaiting the final approval of this project by the Director-General of the Department of Environment and Heritage. We have already had preliminary discussions with Dr Col Limpus regarding this study.
3.5 It will be necessary to provide some data on the costs of conserving turtles even if this is subject to a high degree of error. The first step here will be to identify the measures which are being taken or need to be taken to improve turtle conservation and to get expert opinion on the costs involved.
3.6 If we are able to receive funding, it is planned that there would be an initial visit to Mon Repos in our mid-semester break (September) to familiarise ourselves with the situation there and to make contact with local business and authorities. Then the actual survey of visitors would take place as mentioned earlier, with our report then being prepared and written up before the middle of 2000.

Further points and potential outcomes

4.1 In writing up our report we would plan to make some comparisons with other forms of marine based wildlife tourism, e.g. whale watching and fairy penguins.

4.2 To demonstrate that the potential tourism value and opportunities of non-consumptive turtle-based tourism can be an effective means for helping to cover the costs of their conservation.

4.3 It may well be that the non-consumptive economic value of turtles is quite high. Hence, it is possible that the report could provide economic arguments in favour of turtle conservation. However, one can not pre-judge the outcome in advance. Nevertheless, one can be certain that the study will make suggestions for increasing the economic benefits to be had from turtle-based tourism.

Longer term study

5.1 Although not directly part of the above study, it could be important to study the potential that aboriginal and Torres Strait Islanders could have for using turtles for tourism purposes, possibly in conjunction with other forms of marine wildlife.

5.2 In our report and by way of background, we shall try to take some account of the fact that turtles are a shared international resource. There may be scope for longer term study of this aspect from a socio-economic viewpoint.

ANNEXURE B TO CHAPTER 1

B.1 INTRODUCTION TO NON-CONSUMPTIVE RECREATIONAL TOURISM VALUES OF WILDLIFE WITH COMPARISONS

Since the 1980s, non-consumptive recreational use of wildlife resources has attracted large numbers of visitors. This has generated direct and indirect economic benefits with local and regional multiplier effects (e.g. Glover, 1992, p.1; Parsons, 1996; Burger, 1996, p. 94). The growth has stemmed from development of the tourism industry and the desire for tourists to see wildlife in their natural state. Rapidly dwindling wildlife species and their natural habitats have stimulated development of this trade. Non-consumptive wildlife oriented recreational (NCWOR) tourism marks a clear shift from the traditional consumptive uses of wildlife resources. The activities of NCWOR tourism can be grouped into two main categories. In category one (NCWOR I tourism), tourists visit a national park or protected area to watch wildlife in their natural environment without a focal species in mind. This involves an excursion in the park and viewing whatever wildlife can be watched, although visitors may have preference for some species over others. The majority of ecotourists fall into this category and the number of visitors is usually large. The second category (NCWOR II tourism) involves visiting a designated area with the intention of watching a focal species in its natural habitat. This involves visiting an area (most often a protected area) and waiting for the species to appear for viewing. Usually this involves small groups of individuals viewing from a designated place such as a platform or hide. The individuals may be the wildlife specialists or the wildlife generalists (Duffus and Dearden, 1990, p. 222). Examples include the

viewing of fairy penguins on Phillip Island, Victoria, and watching the Northern Royal albatross colony at Taiaroa Head in New Zealand. However, whilst engaging in one species, incidental contact with other species may occur, for example, seeing short-tailed shearwaters (Tasmanian mutton-birds) during the breeding season on Phillip Island, or the presence of cormorants with the Royal albatross colony. The first category (NCWOR I) is not a new phenomenon. Even in the 19th century, safaris to wild places in Africa to view wildlife were popular among explorers and adventurers from Western Europe (Orams, 1995, p. 4). However, the commercialization of the second category (NCWOR II) is rather a new phenomenon, perhaps dating back to the late 1960s. For example, the right to operate guided tours on a restricted basis to the Northern Royal albatross colony was granted in 1967[3] (Higham, 1998, p. 525), Mon Repos for sea turtles in 1968[4](Kay, 1995, p. 6), Hervey Bay for humpback whales in 1987[5] (Kleinschmidt, 1996, p. 97); and whale sharks in the Ningaloo Marine Park in 1993 (Davis and Tisdell, 1998; p. 162).

Wagar (1969), as reported in Duffus and Dearden (1990), defines NCWOR tourism as a "human recreational engagement with wildlife where the focal organism is not purposefully removed or permanently affected by the engagement". According to Wagar such use provides an experience rather than a tangible product and does not preclude any other person using such a resource in the future. Non-consumptive uses of wildlife resources involve varied activities with a multiplicity of levels of organization all of which will influence the level and types of its impact (Boyle and Samson, 1985). Non-consumptive uses are distinctly different from activities that purposely seek to remove or destroy an organism (Vaske et al., 1998) and do not involve non-use values (existence and bequest values) nor future use values or option values (Bergstrom et al., 1990; p.131; Pearce, 1993, p. 17).

It is worthwhile elaborating on the above point. Economists have defined the total economic value of a natural resource as being equal to its total use values plus total non-use values. Use values involve direct use values, indirect values and option values (Pearce, 1993, p. 17). All wildlife tourism involves use values. However, that tourism may be consumptive of the wildlife resource (game hunting, fishing) or non-consumptive (wildlife viewing and photography). But distinctions between these categories are blurred to some extent in practice. For example, passive wildlife tourism may result in incidental destruction of the wildlife resource (Boyle and Sampson, 1985).

Many studies have been completed to determine the economic and recreational benefits of NCWOR tourism. Estimates from North America show that the values of

[3] Phillip Island parade is an exception where organized viewings of fairy penguins took place as early as the 1920s (Glover, 1992). However, the present day viewing stands and other facilities began to appear in the 1960s when the Shire of Phillip Island and the National Parks and Wildlife Service took control of the management of the present reserve. Since then the facilities and visitors have been systematically increased. The reserve has also been extended since the 1960s.

[4] It must be mentioned here that viewing of turtles took place long before the dates mentioned in this paper but since the commencement of work by Queensland Turtle Research Program at Mon Repos in 1968, research staff have taken the opportunity to explain turtle behaviour to visitors. The present day turtle-watching program was started in 1985 (Kay, 1995, p. 6). A service fee was introduced in the 1994-95 season.

[5] Whale watching in Hervey Bay has occurred for many decades but the whale watching industry commenced in 1987 (Kleinschmidt, 1996, p. 97).

non-consumptive wildlife uses are large and have grown significantly over the years. Fillion et al., (1983) estimated that in 1981 alone, 3.6 million Canadians spent a total of Can $2.1 billion on non-consumptive wildlife-oriented trips. In Canada, income generated from whale-watching in Vancouver Island was estimated at Can $4.2 million in 1988 (Duffus and Dearden, 1990). Statistics maintained by the US Fish and Wildlife Service (1987) show that wildlife viewing as a primary recreational activity increased from 83.2 million to 104.7 million user-days between 1980 and 1985. In Australasia, NCWOR tourism of both categories is popular and in recent years has recorded phenomenal growth (Bureau of Tourism Research, 1989-1995). In Asia, NCWOR I tourism is popular, with NCWOR II tourism also recording rapid growth during the last decade. For example, in India, Nepal and Bangladesh, special wildlife tours organized to view the Bengal Tiger are popular (Mishra, 1995, p. 204; Connolly, 1999, pp. 436-437). Specialized tours to watch the last remaining Asian lions in the Sasan Gir Forest National Park and rhinoceroses in India and Nepal are well known (Connolly, 1999, pp. 773-774). Some specialized bird-watching tours are also conducted in the region (e.g. see Oriental Bird Club (OBC),1998, p. 63). In New Zealand, in addition to NCWOR I, NCWOR II tourism is extremely popular. New Zealand stands out as a country that makes extensive use of this specialized niche market given the limited but unique biological resources it is endowed with. Many bird species such as the penguins (yellow-eyed and little blue), Royal albatrosses, gannet colonies, petrels, kiwis, wading birds, white herons and marine mammals such as dolphins, whales and sea lions have been exploited in recent years as NCWOR resources. Higham (1998, p. 523) provides a complete list of non-consumptive wildlife tourism in New Zealand and their locations and settings.

The number of visitors to sites to view specific wildlife species has increased in recent times. For example, at the Taiaroa Head Northern Royal albatross colony, visitors numbers increased from less than 1,000 in 1972 to more than 40,000 by the end of 1992 (Higham, 1998, p. 526). Tisdell (1990, pp. 88-98) discusses the economic potential of some of these wildlife resources and shows the revenue generated from the Northern Royal albatross colony alone runs into hundreds of thousands of dollars each year.

In Australia, NCWOR II tourism, like NCWOR I tourism, has grown rapidly in recent years. Some examples of non-consumptive wildlife viewing in Australia include: Fairy penguins and fur seals on Phillip Island in Victoria (Glover, 1992); humpback whales in Hervey Bay and Tangalooma, Queensland (Pollard, 1996, p. 49); whale sharks in the Ningaloo Marine Park (Davis and Tisdell, 1998); dolphins at Monkey Mia, Shark Bay (Thompson, 1998, p. 2), Western Australia; and crocodiles in the Northern Territory (Australian Geographic Society, 1999, p. 50). The income and employment generated directly from these ventures are substantial and these activities complement and support other tourist attractions by adding value to tourist spending. For example, estimates for 1994 put the direct value of cetacean-based tourism (mainly dolphins) in Australia at approximately A$8.9 million (Anderson et al., 1996, p. 11). Direct income from ticket sales alone in 1995 from Hervey Bay whale watching cruises was estimated at A$ 3.5 million (Burger, 1996, p. 94).

The number of international tourists (in addition to local tourists) engaged in NCWOR II activities has also increased in recent times (Bureau of Tourism Research, 1989-1995). For example, international visitor numbers to Phillip Island/Penguin

Parade have increased from 187,600 in 1989 to 266,400 in 1995 (Bureau of Tourism Research, various issues, 1989-1995). In 1999, the entrance fee to view fairy penguins and the visitor centre was A$10.50 per adult and A$ 5.50 per child (4-16 years). In addition to direct income generated from entry fees to these sites, the indirect and multiplier effects are large (e.g. see Burger, 1996; Kleinschmidt, 1996). Some of the indirect benefits include revenue from sale of souvenirs, accommodation and catering, transport services, photography, postcards, books and other merchandise (Glover, 1992, p. 4; Burger, 1996, p. 94).

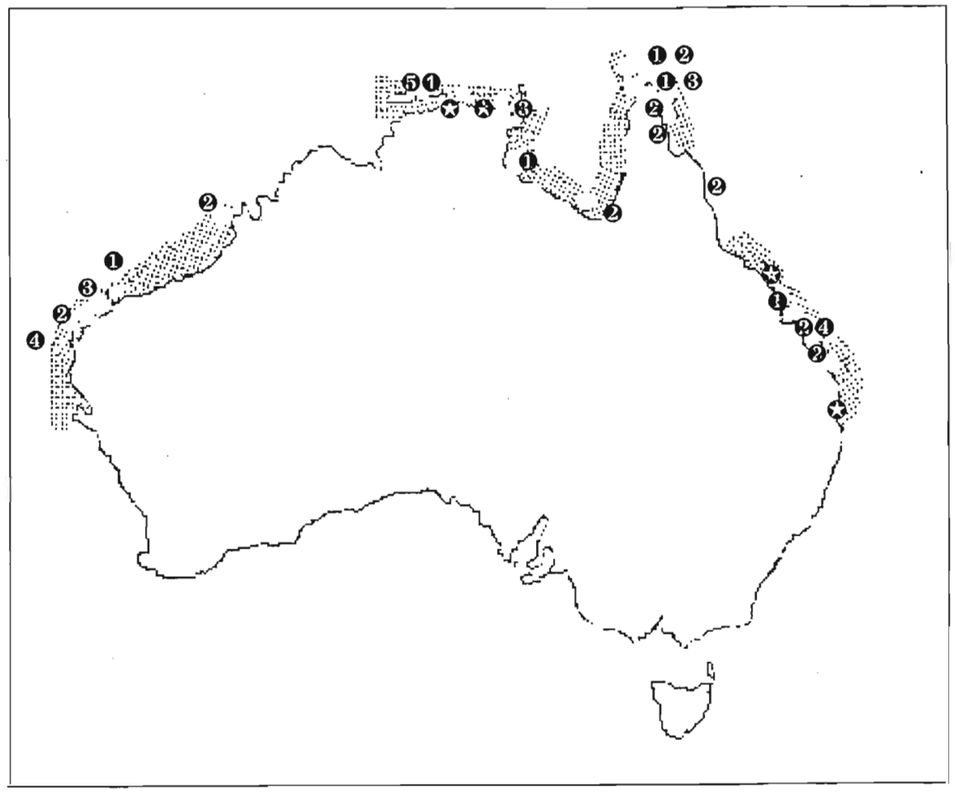
B.2 NON-CONSUMPTIVE WILDLIFE-ORIENTED RECREATIONAL TOURISM: USE OF SEA TURTLES IN AUSTRALIA

Although wildlife resources are increasingly being utilized for non-consumptive wildlife oriented recreation, both in Australia and elsewhere, some wildlife resources such as sea turtles have remained until recently a relatively untapped resource (Wilson and Tisdell, 2000). These wildlife resources offer the opportunity for further expansion of non-consumptive wildlife utilization. Until recently, sea turtles had mostly a consumptive appeal only. However, the tourism value of sea turtles has been revealed judging from the large numbers of visitors to Mon Repos Conservation Park and Heron Island National Park during the Australian summer to view the egg laying spectacle of these marine reptiles. These two relatively small beaches in the southern Great Barrier Reef attract as many as 35,000 visitors each year during the summer (Limpus 1994, p. 138).

Sea turtles are living fossils that have navigated the world's oceans from the time of dinosaurs. These ancient giant marine reptiles have long fascinated people and figured prominently in mythology and folklore of many cultures including the Aborigines and Torres Strait Islanders. Seri Indians, who still live on the shores of the Gulf of California, believe that the world began on the back of a gigantic (leatherback) turtle. In the Miskito Cays of the eastern coast of Nicaragua, the natives still believe in the story of a kind "Turtle Mother" (a benevolent spirit), who acts as an intermediary between the worlds of animals and humans (Ripple, 1996, p. 10). Turtle folklore is also well known in Fiji (Guinea, 1993, p. 11). Besides the mythology that surrounds the sea turtles, they are considered by many as mystical, uncommon, a unique sea reptile and a source of living wonder and of curiosity. These attributes make sea turtles a valuable NCWOR resource for ecotourism development. Six of the seven species of sea turtles visit the Western, North-Western, North-Eastern and Eastern beaches of Australia for nesting, mostly during the summer months of October to March, depending on the species (Limpus and Miller, 1993, p. 135). Some beaches have large numbers of nesting turtles each night during the nesting season. The important rookeries are visited by turtles in their hundreds or even thousands. In fact, Australia has some of the most important major and minor rookeries of turtles in the world (see Figure B.1 for distribution of the six species of sea turtles in Australia). Limpus (1994, p. 100) points out that 'Australia is one of the few countries that still has large breeding aggregations of marine turtles comparable to what they would have been like 200 years ago'.

In addition, the flatback sea turtle is unique to the Australian continental shelf (Limpus, 1988, p. 63) which is an added attraction to ecotourists, including wildlife specialists from overseas. Four species of turtle (green, flatback, loggerhead and hawksbill) occur in globally significant numbers in Australian rookeries (Limpus, 1994, p. 100) while two species (leatherback and olive ridley) occur in smaller numbers. The size of Australia's visiting populations and the variety of its species makes turtle-based tourism attractive for Australia.

FIGURE B.1: THE PRIMARY BREEDING AREAS OF SEA TURTLES IN AUSTRALIA



Source: Adapted from Limpus and Miller (1993, p. 138). The Figure shows the primary breeding areas of flatback [❶], green [❷], hawksbill [❸], loggerhead [❹], olive ridley [❺] and leatherback [✪] turtles in Australia. Shading areas indicate the primary breeding areas of all turtles recorded in Australia (obviously the breeding areas overlap). Major nesting colonies (>1000 females/year) and minor colonies (hundreds of females/year) are indicated by large and small numerical numbers respectively. Leatherback turtles occur in Australia in small numbers.

However, there are additional reasons why Australia is well placed to take advantage of this sustainable marine resource. The major nesting season of turtles coincide with the summer holiday season in Australia and the winter months in Europe and North

America. Bureau of Tourism Research (1989-1995) statistics show that the largest proportion of international nature-based tourists to Australia come from Europe and North America and their numbers have increased in recent years. Hence, the potential to attract both local and international visitors for watching sea turtles is large. Furthermore, Australia's tourism infrastructure is well developed for the exploitation of this resource and it has a considerable amount of experience in ecotourism. At Mon Repos Conservation Park and Heron Island National Park not only do visitors get an opportunity to view these sea reptiles dragging their heavy bodies ashore, but may also witness the egg-laying spectacle. Baby turtles emerging from their nests and then making their way to the sea are an added attraction. Hence, turtle viewing not only offers an opportunity to view sea turtles in their natural habitat, but also provides an opportunity to study them.

Turtle-based tourism viewing can generate income and provide employment and at the same time support the conservation efforts of sea turtles. The experience imparted from viewing is educational and this can assist in preserving and conserving sea turtles for future generations. Turtle viewing can be used to increase public awareness on the threats facing sea turtles and their habitats as is done in Sri Lanka (Gampell, 1999, p. 54). For example, edu-tourism (see M. Tisdell, 1998, p. 109) can go a long way in educating the public about threats to sea turtles and can also help to raise money for conservation. Sea turtle viewing can be further complemented by establishing visitor centres and museums dedicated to turtles, depicting all aspects of sea turtles ranging from their biology, life at sea, current turtle research, main threats to sea turtles, history of commercial sea turtle harvesting (both Australia and world-wide) and what tourists can do to help the species, as has been done at Mon Repos since 1993-4 (Kay, 1995). The success of Phillip Island is a good example of how public awareness can be increased through ecotourism and the education imparted (Glover, 1992). Visitor centres and museums can enhance the visitors knowledge of turtles and the need to protect them. Information gathered from satellite tracking can be shown as is done with fairy penguins on TV screens on Phillip Island or even display live sea turtle tracking taking place in the oceans.

Many turtles and their rookeries in Australia are located in traditional territories of Aborigines and Torres Strait Islanders. Sea turtles play an important role in the traditions and culture of these native people. These people have traditionally hunted sea turtles although some groups exclude hunting because of spiritual beliefs (GBRMPA, 1994, p. 3). Making use of the knowledge of these people in sea-turtle-based tourism can not only provide new employment and income-generating avenues for them but also help in the conservation of turtles. Possibly when native communities experience the economic benefits from turtle-based tourism, they will be discouraged from their consumptive uses of sea turtles. In addition, sea-turtle-based tourism can be complemented with Aboriginal and Torres Strait Islanders cultural attractions, for example, conducted tours to learn more about their culture, lifestyles and art works. The sale of Aboriginal art-works can be an added source of revenue. Cultural activities such as dance can be organized to accompany turtle viewing and study.

Sea turtle breeding can be encouraged as is now being done with the hawksbill turtle in the Northern Territory or with the green turtles in the Cayman Islands (Ripple, 1996, p. 20). Breeding farms can be tourist attractions.

Sea turtles that come ashore mostly at night to nest can be easily disturbed by noise, artificial lights and other human activities (Arianoutsou, 1988, pp. 331-332; Ripple, 1996, pp. 23-25). This can result in sea turtles returning to the sea without nesting. Hence, turtle-viewing has to take into consideration the sensitivity of these creatures if it is to be a success. At Mon Repos and Heron Island, park wardens guide visitors in batches to watch the egg-laying spectacle as well as hatchlings leaving the nests under supervision. The number of visitors for each site may also be limited as is done at Mon Repos and Heron Island.

Most sea turtles come ashore throughout the night for nesting. This nocturnal habit may be considered as a potential drawback for tourist viewing. However, ecotourists are known to go on safaris or bird-watching in the early hours of the morning and rest during the day. In fact the hot summer weather makes it all the more attractive to view sea turtles during the night rather than by day in the tropics. High visitor numbers at Mon Repos and Heron Island indicate that night-time viewing is not a major drawback. However, it is a problem for families with relatively small children.

B.3 THREATS TO SEA TURTLES AND THE NEED TO COUNTER THESE THREATS

Although sea turtles are still found in large numbers in Australian waters and visit the beaches for nesting, they are being severely threatened (Limpus, 1994, p. 100). The threats facing turtles in Australia and world-wide vary from species to species. In this section, the threats facing sea turtles with special reference to Australia are outlined. These threats underline the urgency of developing a sustainable economic activity such as sea-turtle-based tourism to underpin their conservation.

Sea turtles are harvested for their meat, tortoiseshells and many other by-products. Turtle meat and eggs form an important part of the diet of many island and coastal native communities including the Aborigines and Torres Strait Islanders. The green turtle is favoured for eating and is actively hunted by indigenous Australians in the tropics (Limpus, 1994, p. 100), where considerable harvesting of sea turtles take place each year in Torres Strait, the Northern Territory and Queensland. It is a traditional food item for the region (Limpus and Parmenter, 1986, p. 98)[6].

Numerous turtles are harvested in areas neighbouring Australia such as Eastern Indonesia, Irian Jaya, Southern Papua New Guinea, Solomon Islands, Vanuatu and New Caledonia, posing a significant threat to the long-term survival of the species in Australia (Limpus, 1994, p. 100). As many as 100,000 green turtles are slaughtered each year in these countries (Limpus, 1988, p. 64). Loggerheads are also sometimes harvested for food (Limpus and Parmenter, 1986, p. 98; Limpus and Reimer, 1990, p. 43).

Turtle eggs are harvested for food by many native communities and in some cultures are believed to be an aphrodisiac and to promote healthy skin. In some countries,

[6] Limpus and Parmenter (1986, p. 98) state that around 10,000 green turtles were harvested in the late 1970s. Harris et al. (1995) state that 9,000 are harvested for meat in the Torres Straits each year.

turtle eggs are regularly sold and are a valuable source of cash income. Hawksbill turtle eggs are commonly gathered for eating by Torres Strait Islanders (Limpus and Parmenter, 1986; Limpus, 1994, p. 103) and Australian Aborigines and Torres Strait Islanders harvest green turtle eggs on a regular basis. Excessive harvesting of leatherback turtle eggs by native communities in Southeast Asia is a major threat for this species (Limpus, 1994, p. 103). Eggs of flatbacks are also taken (Limpus, 1988, p. 63).

In Australia, native communities (Aborigines and Torres Strait Islanders) are permitted by law to harvest sea turtles for non-commercial purposes (GBRMPA, 1994, p. 3). However, the illegal and in some cases legal slaughter of sea turtles and poaching of eggs, mainly in developing countries, are major problems endangering the survival of these ancient sea reptiles, but are not the only threats.

Sea turtles are highly migratory reptiles (moving between feeding and nesting grounds) which spend most of their time at sea and among coral reefs (Carr, 1980; Limpus, 1991). Hence, they are vulnerable to many dangers, which range from predation in the oceans by larger fish and sharks to marine pollution, accidents caused by motorized boats (boat strikes) and accidental entanglement and eventual drowning in fishing, crab, shark and gill nets (Limpus and Reimer, 1990). The commercial fishing industry, in particular the prawn trawling industry, has been the most frequently identified cause of mortality of loggerhead turtles (Pointer and Harris, 1990). The harvesting of the Sargassum sea weed which provides essential shelter and food for the turtle hatchlings and post-hatchlings (see Musick and Limpus, 1997) as a cheap additive to livestock feed is now a major threat to the survival of sea turtles in some regions. The ingestion of plastics floating in the ocean by turtles (especially the leatherbacks) which mistake some plastics and plastic bags for jelly fish results in many deaths among turtles (Limpus and Reimer, 1990).

Apart from the demand for turtle meat, leatherback turtles (the only turtle without a hard shell) are killed for their body oil which is used for fuel and medicinal purposes. The olive ridley is harvested for its leather (Limpus and Miller, 1993, p. 137). Hawksbill turtles are harvested for their beautiful shells (bekko in Japanese) which are used to make expensive jewellery and ornamental products, especially in Japan, and occasionally cosmetics. Although no tortoiseshells are exported from Australia, hawksbills that breed in Australia and migrate to neighbouring countries, such as the Solomon Islands and Eastern Indonesia, are harvested for the bekko trade. Thousands of hawksbills are harvested each year for this purpose (Limpus, 1988, p. 65).

The destruction of coastal beaches due to natural erosion, human settlement, resort development and recreation has deprived turtles of quality nesting grounds (National Research Council, 1990). Apart from the harvesting of eggs by native communities, predation of eggs by introduced foxes and feral pigs in Australia takes place on a large scale (Limpus and Reimer, 1990, p. 42; Chaloupka and Limpus, 1997). Limpus and Reimer (1990, p. 42) state that during the 1970s and 1980s, annual fox predation rates of egg clutches laid along the 22 km beaches at Wreck Rock increased to over 90% and it became rare to observe hatchling emergences.

There is also natural predation by dingos and land reptiles such as goannas. Hatchlings are vulnerable to a vast array of predators ranging from sea birds,

especially large gulls and skuas, raptors (such as sea-eagles, kites), to crabs, and the above mentioned mammals and reptiles. Artificial beachfront lights from buildings, streetlights, dune crossovers, vehicles, campfires and flashlights disorientate turtle hatchlings towards land thereby exposing them to further predations and accidents (e.g. motor vehicles) and exhaustion from heat and eventual death from starvation (Arianoutsou, 1988; Ripple, 1996, p. 24). At sea, turtle hatchlings are highly vulnerable to predation from sea birds, large fish and sharks (Limpus, 1991). Apart from the above mentioned factors, turtles also die of diseases. The main disease affecting them is a tumour-causing disease called fibropapillomatosis (Papillomas).

Thus, it can be seen that turtles are vulnerable to many hazards (natural and man-made) from the time the eggs are laid. As a result of the high mortality of turtle hatchlings, only a few survive to adulthood from each clutch of eggs. The man-made problems affecting sea turtles are increasing and the problems confronting turtles vary from country to country and from region to region.

Because turtles are a shared international resource, laws enacted and enforced in one county are insufficient for their total protection if no or little protection is afforded in neighbouring and other countries to which turtles migrate. For example, the feeding grounds and migratory pathways of some turtles that breed in Australia span the territorial waters of three or more nations (Limpus and Parmenter, 1986, p. 100) which make turtles vulnerable to mass slaughter. Tens of thousands of these turtles are harvested annually in countries near Australia. It is estimated that 90 percent of the harvest of green turtles breeding in Australia occurs outside Australia because of migration (Limpus, 1988, p. 64). The protection and conservation of sea turtles seem more difficult than for land mammals because of their wider ranging movements. The complex and secretive life of sea turtles (they spend most of their lives at sea), make it all the more difficult and expensive to study sea turtles to devise strategies to protect and conserve them.

B.4 PROBLEMS ASSOCIATED WITH THE SUSTAINABILITY OF NON-CONSUMPTIVE WILDLIFE TOURISM, ESPECIALLY SEA TURTLE-BASED TOURISM

Wildlife-based tourism can provide strong economic incentives for wildlife conservation. Nevertheless the development of ecotourism, is not without problems. Wildlife tourism must be carefully managed if the resources on which it depends are to be utilized on a sustainable basis.

NCWOR tourism can adversely affect wildlife as a result of human disturbances, infrastructural development and pollution arising from such tourism. Higham (1998) notes that although Northern Royal albatrosses of Taiaroa Head are tolerant of human presence, significant negative impacts have been observed. Robertson (1992) using nesting records collected since the 1930s confirms that the nesting distribution of Northern Royal albatrosses at Taiaroa Head has gradually shifted from optimal to sub-optimal nesting areas in terms of nest availability due to human presence. This has taken place despite these birds being conservative in nature in site-selection (for a discussion on some other human impacts on the Northern Royal albatross colony, see Higham 1998, pp. 529-530). In North America, too, the effects of NCWOR activities

have been studied for a wide range of wildlife resources. For example, Boyle and Samson (1985) review the 536 studies concerning the effects of non-consumptive outdoor recreation on wildlife.

A few studies have been conducted to determine the impact of tourism on breeding sea turtles, but no scientific studies have been specifically related to sea turtle-based tourism. For instance, Hosier et al., (1981) and Arianoutsou (1988) have studied the impact of tourism (i.e. use of beaches by tourists during the day) and tourism infrastructural development of coastal areas on turtle nesting. Their findings are useful in identifying some potential problems and threats that can arise from turtle-based tourism. Arianoutsou (1988, pp. 330-332) from a study on Zakynthos Island, Greece, points out that bright lights and noise can discourage adult females from coming ashore to lay eggs or interrupt the egg laying process. He further points out that tourists using the beaches during the day, vehicles on the beach (close to the waters edge), motor boats close to the beach and planting of trees on the beaches can in one way or another adversely affect the nesting of sea turtles. Hatchlings can also be affected by bright lights because such lights cause disorientation (ibid.). Hosier et al., (1981) showed that vehicular tracks on a nesting beach increase the time taken by hatchlings to reach the sea by 35 percent at which time they can be exhausted and hence become more vulnerable to predation. Excessive trampling of beaches by people can damage turtle eggs as well as the emergence of hatchlings (Bustard, 1972). Arianoutsou (1988, p. 332) further points out that night-time disturbances may be caused to turtles by people who come to the beach in groups to watch nesting animals. Dean and Talbert (1975) observed that loggerhead nesting activity in South Carolina was lowest in areas where beach houses are present, even if the beach appears ideal for nesting. Declines in nesting population of loggerheads in Florida have been attributed to urban development (Worth and Smith, 1976). Bustard (1972) considers coastal development and construction in nesting areas to be the greatest threat to the loggerheads in Queensland, Australia.

The above mentioned studies demonstrate that sea-turtle-based tourism can adversely impact on breeding sea turtles if insufficient safeguards are adopted. If sustainable use of this valuable resource is to be expanded, then strict guidelines have to be adopted for tourism development. These need to be developed in consultation with marine biologists experienced in this field. Overall the long-term success of sea turtle-based tourism depends on how well the wild stocks are managed. Experience at Mon Repos is providing important pointers to appropriate methods of managing turtle-based tourism and the lessons learnt may be transferable to other regions where sea turtles are used or can be used for tourism.

CHAPTER 2

DISCUSSION AND RESULTS OF SURVEY
Part I

2.1 Mon Repos visitors' profile

Since the 1980s and 1990s significant numbers of national and international visitors have come to Mon Repos for sea turtle viewing. It is one of the major non-consumptive tourism and nature-based tourism activities in the Bundaberg/Burnett area. Data maintained by QPWS show that a total of 135,984 visitors came to Mon Repos Conservation Park during the last 7 years in order to view sea turtles, i.e. an average of 19,426 visitors per year. The number of visitors to Mon Repos for 1999/2000 was 23,485. Table 2.1 gives the annual number of visitors to Mon Repos for turtle-watching for the period 1993/94 to 1999/2000.

TABLE 2.1: ANNUAL VISITORS TO MON REPOS FOR TURTLE-WATCHING

Season	Visitor Numbers
1993/4	23,580
1994/5	14,858
1995/6	19,962
1996/7	18,284
1997/8	17,394
1998/9	18,421
1999/2000	23,485

Source: Queensland Parks and Wildlife Service, 2000 (unpublished data)

While the exact proportion of scientists and experts in sea turtles relative to the total number of visitors to Mon Repos and in comparison to ordinary tourists is unknown, it seems likely that the latter have increased proportionately since 1968, and probably since the mid-1980s has exceeded the former. This would accord with the hypothesis of Duffus and Dreaden (1990) about the pattern of development of ecotourism. But it is less clear that the total visitor numbers follow the logistic-type curve as suggested by Butler (1980). As can be seen from Table 2.1, visitor numbers compared to 1993/94 fell substantially in 1994/1995 and did not recover to the levels of 1993/94 until the 1999/2000 season. Whether or not the recent upward trend in visitor numbers will continue remains to be seen.

As a result of the growing numbers of visitors to Mon Repos and the importance of Mon Repos as the main rookery for sea turtle viewing in Australia, it is important to determine the profile of visitors and to examine what factors influence sea turtle viewing by visitors to Mon Repos. Such information is important for the further expansion and development of sea turtle-based ecotourism in Australia and elsewhere.

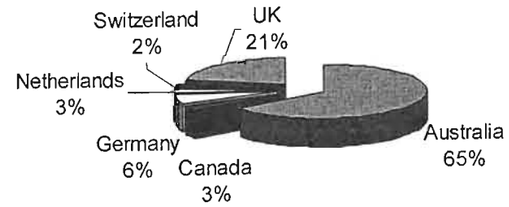
Section I (Part I) of the questionnaire was, therefore, designed to obtain data on profiles of visitors to Mon Repos. Data collected were used to determine the country of origin and the state from where the visitors traveled to Mon Repos. The data gathered in this section also included: size of groups, mode of transport, the distance travelled to view sea turtles and other data. The data are discussed below.

In the sample group there were visitors from 18 countries and the majority of them, as expected, were from Australia. A considerable number of European tourists visited Mon Repos. For example, there were significant numbers of visitors in the surveyed respondents from the U.K (21%), Germany (6%), Netherlands (3%) and Switzerland (2%). North Americans, too, visited Mon Repos in quite significant numbers (see Figure 2.1 and Table 2.2). The number of Asian visitors was almost negligible but it is possible that fewer Asians completed the questionnaire because of language limitations. There were some visitors in the surveyed group from Israel and South Africa where sea turtle viewing is established. Some of these respondents had in fact visited these sites in their respective countries.

Table 2.2
NATIONALITY OF SURVEYED VISITORS TO MON REPOS

Australia	314
Belgium	1
Canada	15
China	1
Denmark	1
France	3
Germany	27
Ireland	2
Israel	4
Korea	1
Netherlands	14
New Zealand	9
Norway	4
South Africa	1
Sweden	4
Switzerland	11
UK	101
USA	6

Figure 2.1
PERCENTAGE OF MAJOR NATIONALITIES OF SURVEYED VISITORS TO MON REPOS

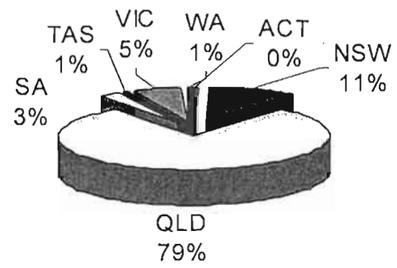


Statewise most surveyed visitors to Mon Repos were from Queensland (79%). This is probably due to relative proximity to Mon Repos and availability of information about sea turtle viewing, especially made available by the local media. The other state visitors were from New South Wales (11%), Victoria (5%) and South Australia (5%). The number of visitors from Western Australia, Tasmania and Australian Capital Territory were low in the sampled group (Figure 2.2, Table 2.3). Interestingly, no visitors were recorded from the Northern Territory. However, some of the major sea turtle rookeries in Australia are located in the Northern Territory, with nesting taking place throughout the year in some areas.

TABLE 2.3
SURVEYED AUSTRALIAN VISITOR NUMBERS TO MON REPOS

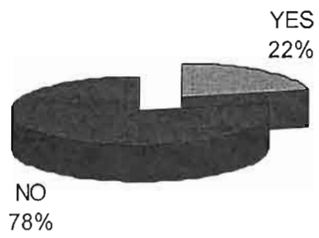
ACT	1
NSW	34
QLD	249
SA	8
TAS	2
VIC	17
WA	3

FIGURE 2.2
PERCENTAGE OF AUSTRALIAN STATE VISITORS TO MON REPOS IN THE SURVEYED GROUP



The majority of respondents were visiting Mon Repos for the first time (78%) while the rest (22%) had visited Mon Repos before, ranging from those who had visited once before (61%) to more than 10 times or more (6%). Figure 2.3 shows the percentage of surveyed visitors who had visited Mon Repos once or more before their current visit.

FIGURE 2.3: PERCENTAGE OF SURVEYED VISITORS WHO HAVE VISITED MON REPOS BEFORE



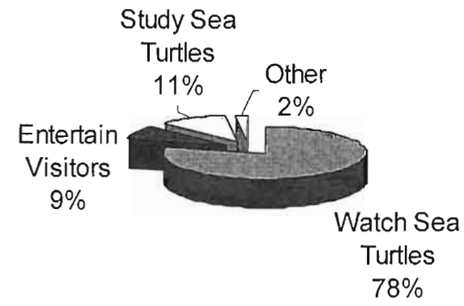
Most surveyed visitors to Mon Repos came in groups of two or more. Family groups were common and the highest number of visitors were couples. The size distribution of groups to Mon Repos in the sample is shown in Table 2.4.

TABLE 2.4: SIZE OF GROUPS VISITING MON REPOS

Group Size	Number	Percentage
1	49	9
2	210	41
3	58	11
4	90	18
5	46	9
6-9	49	9
10-19	6	1
20>	11	2
Total	**519**	**100**

The majority of surveyed visitors came to Mon Repos to watch sea turtles (78%) while some came especially to study sea turtles (11%) and entertain visitors (9%). The purpose of their visits is shown in Figure 2.4.

FIGURE 2.4: PURPOSE OF VISIT OF SURVEYED VISITORS TO MON REPOS



The majority of the respondents travelled by car to Mon Repos from the place they were staying overnight. The mode of transport of visitors is shown in Table 2.5.

The information about Mon Repos sea turtles was mainly through word of mouth followed by QPWS brochures, mass media (newspapers and TV), previous visit(s) and other sources, such as travel guides, magazines, tourist information centers and brochures. The breakdown and percentages are shown in Table 2.6.

TABLE 2.5: MODE OF TRANSPORT OF SURVEYED VISITORS TO MON REPOS

	To Bundaberg	%	To Mon Repos Conservation Park	%
Car	381	73	381	74
Coach	71	14	60	12
Caravan	40	7	37	7
Train	9	2	-	-
Plane	6	1	-	-
Walk	-	-	28	5
Van	9	2	10	2
4 Wheel Drive	2	-	2	-
Hitchhike	1	-	1	-
Total	**519**		**519**	

TABLE 2.6: PROVISION OF INFORMATION ON MON REPOS SEA TURTLES TO SURVEYED VISITORS

	Number	Percentage
(1) Mass Media		
• TV	30	6
• Newspapers	17	4
(2) QNPWS brochures	76	15
(3) Word of Mouth	203	39
(4) Previous Visit	50	10
(5) Others		
• Guide books	88	17
• Magazines	15	03
• Tourist information centers/brochures	25	05
• Information provided by Hotels/hostels	08	01
• Billboards	03	-
• Information on busses	02	-
• Bundaberg Map	02	-
Total	**519**	**100**

The survey revealed that some visitors arrived at a place close to Mon Repos (< 60 km) on the night before they viewed sea turtles, while some travelled from outside a 60 km radius. It was revealed that 44 percent of the surveyed visitors travelled from within a 60 km radius the day before the sea turtle viewing, while the rest (56%) travelled from outside a 60 km distance. Visitors had travelled approximately 169.52 km on average from the place they had stayed the previous night before they arrived in Mon Repos. The majority of surveyed visitors (96%) stayed within a 60 km radius after viewing sea turtles, 98% of them staying within a 20-25 km radius from the Mon Repos Conservation Park. This included 5% of permanent residents living within this zone. Only 4 % travelled outside a 60 km radius after viewing sea turtles. The surveyed sea turtle visitors spent an average of 3.21 nights in the Bundaberg region, including the Caravan Park adjacent to the Conservation Park. The breakdown of the number of nights spent by the surveyed respondents is shown in Table 2.7.

TABLE 2.7: NUMBER OF NIGHTS SPENT BY THE SURVEYED VISITORS WITHIN THE BUNDABERG REGION

Number of Nights Spent In the Bundaberg Area (within a 60 km radius of Bundaberg)	Number of Respondents	Percentage
1	174	34
2	135	26
3	48	09
4	29	06
5	17	03
6	11	02
7	28	05
8	01	-
9	02	-
10	09	02
12	02	-
14	05	01
15	02	-
17	01	-
20	04	01
21	04	01
35	01	-
Locals	25	05
Outside	20	04
Total	**519**	**100**

As Table 2.7 shows most surveyed visitors spent one or two days in the Bundaberg region. Of the visitors coming to view sea turtles, 29% stayed at the Caravan Park adjacent to the Conservation Park spending an average of 2.52 nights.

In order to determine the importance of sea turtles in attracting visitors to Bundaberg the following questions were asked:

If it were **NOT** for the presence of sea turtle viewing at Mon Repos, would you/family/party have visited the Bundaberg (within 60km radius) area?

Yes ☐ No ☐

If **YES**, would you have reduced your stay within 60 km radius of Bundaberg if there were no sea turtles in this area?

Yes ☐ No ☐

If **YES,** by how many days?

Yes ☐ No ☐

The data obtained from the survey clearly show that sea turtles in the region is an important factor in attracting tourists to Bundaberg during the sea turtle season. 40% of the respondents said that they would not have visited Bundaberg if not for the presence of sea turtles. The proportion of tourists who would and who would not have visited Bundaberg if not for the presence of sea turtles is shown in Table 2.8.

TABLE 2.8: SURVEYED VISITORS TO MON REPOS WHO CAME TO THE BUNDABERG REGION DUE TO THE PRESENCE OF SEA TURTLES

	Number of Respondents	Percentage
Yes	280	54
No	208	40
Locals	25	5
No response	06	1
Total	**519**	**100**

Of the visitors to Mon Repos surveyed, 19% (excluding locals) would have reduced their stay within 60 km radius of Bundaberg if there were no sea turtles in the area. 38% of respondents said they would have visited Bundaberg and not reduced their stay even in the absence of sea turtles. The percentage of non-responses was 43%.

The number of reduced days in the Bundaberg area (within a 60 km radius) was 110 days at an average of 1.34 days for this group. There were 13 non-responses.

Similar questions were asked to determine the number of visitors who would not have come to Mon Repos if not for the presence of sea turtles. They were as follows:

If it were **NOT** for the presence of sea turtle viewing at Mon Repos, would you/family/party have visited Mon Repos?

Yes ☐ No ☐

If **YES**, would you have reduced your stay in Mon Repos if sea turtles did not occur there?

Yes ☐ No ☐

If **YES**, by how many days?

Yes ☐ No ☐

TABLE 2.9: SURVEYED VISITORS WHO CAME TO MON REPOS DUE TO THE PRESENCE OF SEA TURTLES

	Number of Respondents	Percentage
Yes	67	13
No	452	87
Total	**519**	**100**

The largest number of respondents said that they would not have visited Mon Repos if not for the presence sea turtles. As shown in Table 2.9 the percentage of respondents who would not have visited Mon Repos if sea turtles did not occur there was 87%. This included two percent of the locals. Of the 13% who said that they would visit Mon Repos even in the absence of sea turtles, 25% said that they would have reduced the number of days spent at Mon Repos. The rest (75%) would not have reduced the number of days spent at Mon Repos even if sea turtles did not occur there. The number of days that would have been reduced if sea turtles did not occur at Mon Repos was 1.64 days per person. The beach at Mon Repos is perhaps the main reason for the 13% of visitors to go to Mon Repos even in the absence of sea turtles. 3% of these visitors were locals.

A large number of surveyed visitors spent only a single night watching sea turtles while those spending four or more days were few. Table 2.10 shows the number of nights surveyed visitors spent watching sea turtles at Mon Repos.

TABLE 2.10: NUMBER OF NIGHTS SPENT WATCHING SEA TURTLES

Number of Nights	Number of Respondents	Percentage
01	406	78
02	76	15
03	18	04
04	09	02
5>9	07	01
10>15	02	-
Total	**519**	**100**

For most respondents (87%) the visit to view sea turtles was the main purpose of the trip on the day they watched sea turtles. 13% of the respondents who said that viewing sea turtles was not the main purpose of the trip on the day they travelled to Mon Repos visited the Bundaberg distillery (52%), beach (26%), museums (9%) gardens and parks (8%), and towns (5%) during the day.

Apart from visiting Mon Repos to view sea turtles there were many other sites visited during the journey away from home. 75% of the respondents had visited either a beach, theme park, museum, national park or a nature reserve. Another 4% had engaged in other activities such as visiting the Bundaberg rum distillery, relatives, friends and towns. The breakdown is shown in Table 2.11.

TABLE 2.11: PLACES VISITED BY THE SURVEYED RESPONDENTS DURING THE JOURNEY AWAY FROM HOME

Place/Activity	Number of Respondents	Percentage
Beach	347	67
Theme Parks	54	10
Museums	132	25
National Parks	231	45
Others*	23	4

*Includes 16 locals. Note: Respondent numbers and their percentages are not mutually exclusive.

2.2 The economic benefits of Mon Repos sea turtle viewing to the region

A recreational activity that attracts thousands of visitors a year to an area provides economic benefits to the local area and perhaps to the region at large. Such an activity may help to develop political support for wildlife based tourism in the local area where it is located. As shown in Table 2.1 over 19,000 visitors on average per year came to Mon Repos during the last 7 years from mid-November to end of March. During the 1999/2000 season the number of visitors who came to view sea turtles was 23,485. In this section the economic benefits of sea turtle viewing to the area are discussed and in later sections, the educational and conservation benefits are examined.

Section I (Part I) of the questionnaire was designed to determine the economic benefits to the region of sea turtle viewing at Mon Repos. Two questions were designed to capture the monetary benefits. One question was aimed at estimating the expenditures of sea turtle viewers in the Bundaberg area while the other question was aimed at estimating the expenditures at Mon Repos. The questions were framed as follows:

How much expenditure did you/family/party incur **a day** while you were in the Bundaberg (within 60 km radius) region? [Please state approximate costs such as accommodation, food, travelling (fuel, coach,), souvenirs purchased, theme parks visited, etc].

Aus $ (approx) .....per day

How much expenditure did you/family/party incur **a day** while you were in Mon Repos?
[Please state approximate costs such as travelling (fuel, taxi), souvenirs purchased, park entrance fee, etc].

Aus $ (approx) .....per day

Table 2.12 shows that the monetary benefits accruing from sea turtle viewing is quite significant both to Mon Repos and to the Bundaberg region. The average expenditure per respondent on accommodation, food, travelling (fuel, coach, air, train fee), souvenirs purchased, recreational activities in the Bundaberg region is Aus $24.88, while the expenditures at Mon Repos per respondent is Aus $10.57 per day. The expenditures at Mon Repos include: Conservation park entrance fees, travelling (fuel, taxi) and souvenirs purchased. The total average expenditure per surveyed respondent is Aus $35.45 per day.

TABLE 2.12: AVERAGE DAILY EXPENDITURES OF SURVEYED SEA TURTLE VIEWERS

Expenditure	Respondents	Group	Expenditure A$	Average A$
Bundaberg	479+	1,741	43,330.50	24.88
Mon Repos	519	1,955	20,683.00	10.57
Bundaberg and Mon Repos*			64,013.50	35.45

+ Excludes the 25 local visitors (< 60 km radius) and 15 non responses
* The visitors expenditures at Mon Repos and for the Bundaberg region were estimated separately. There is no double counting involved.

Assuming that the average expenditure due to sea turtle viewing for the 23,580 visitors is Aus $35.45 per day, then the approximate total direct expenditures in Bundaberg and Mon Repos region due to sea turtle viewing is around Aus $835,911 per day resulting from sea turtle viewing. Since the average number of days spent by visitors is 3.21 days, the amount of expenditure in the region for the sea turtle season is approximately Aus $2.68 million for the 1999/2000 season.

However, not all the visitors surveyed would have avoided the Bundaberg region if sea turtles did not occur at Mon Repos. Some visitors would have come to the region even without the presence of sea turtles. In order to estimate the local economic importance of sea turtle viewing if sea turtles did not occur at Mon Repos, the respondents were asked questions to determine the following:

1) the set of visitors who would not have come to the Bundaberg area except for the possibility of sea turtle-viewing at Mon Repos;
2) those that would have visited the area but would have reduced their number of days of stay by a specified number;
3) and those who were locals

Number of days spent by the first set times their average expenditure per day gives an indication of the primary expenditure which would be lost on account of the first set. For the second set, their reduced number of days times their average expenditure per day is relevant.

40% of respondents said that if sea turtles were absent they would not have visited the Bundaberg region. Sea turtles were their main reason for visiting. These 208 respondents (including 8 who would have stayed outside the 60km radius) spent or planned to spend 496 days in the Bundaberg area at an average of 2.38 days per

respondent. The average expenditure for the sample and group in the Bundaberg area was Aus $35.45. In the absence of sea turtle viewing in Mon Repos their daily expenditure for this number of days would be lost as an initial economic injection. The loss of income for the Bundaberg area (within a 60 km radius) from the sampled respondents was Aus $17,583.20. Loss of income based on number of visitors for the 1999/2000 season, assuming 40% did not visit Bundaberg if sea turtles did not occur at Mon Repos, is Aus $792, 581.17. There is also loss of income from the number of reduced days visitors would have spent in the Bundaberg area if sea turtles did not occur in Mon Repos. The number of reduced days among the 99 (19%) respondents was 110 days at an average of 1.11 days per respondent. Loss of income for the Bundaberg area due to reduced days from the sampled respondents if sea turtles did not occur in Mon Repos is Aus $3,899.50. Loss of income due to reduced stay by visitors in the Bundaberg area based on numbers for the 1999/2000 season, assuming 19% of respondents reduced their stay, if sea turtles did not occur in Mon Repos, would be Aus $175,583.50. Therefore, the total income lost to the Bundaberg area (within a 60 mile radius) if sea turtles did not occur in Mon Repos would on the basis of 1999/2000 season visits amount to Aus $792,581.17 + Aus $175,583.50 = Aus $968,164.54, almost Aus $1m. It is worth noting that 98% of the visitors stayed within a 20-25 km radius of the Mon Repos Conservation Park.

As can be seen, the income to the Bundaberg area due to the presence of sea turtles at Mon Repos is close to a million Australian dollars per year. With the multiplier effects, the benefits to the region are even larger. Apart from sea turtle viewing at Mon Repos, a sea turtle festival has been organized since 1999 to mark the beginning of the sea turtle season in mid November. With such activities and the potential for other commercial tourist activities related to sea turtles, the economic benefits to the region from turtles at Mon Repos are even larger. Considering the short season (approximately 4 months) and the scarcity of the wildlife that is being viewed (average of 190 sea turtles for the last 4 years), the income generated from sea turtle watching is significant. Sea turtle watching at Mon Repos is, therefore, one of the important economic activities of the region apart from other activities such as whale watching (for approximately 4 months of the year), sugar cane farming, beef production and dairy farming.

From the surveyed visitors it is shown that the largest group of visitors to Mon Repos Conservation Park were between the ages of 16-45. Of this figure, 21% were between the ages of 16-25, 26% between the ages of 26-35 and 24% were between the ages of 36-45. The study shows that a considerable number had just finished school or tertiary education and were taking a year out. This was especially so for foreign visitors. The data show that after the age group, 46-55, the number of visitors begin to decline. 15% of the visitors belonged to the 46-55 age category and this figure dropped considerably to 6.7% for the 56-65 age group and 3.7% for the 66-75 age group. The largest number of surveyed visitors were employed. The socio-economic background of visitors to Mon Repos is shown in Table 2.13.

TABLE 2.13: SOCIO-ECONOMIC BACKGROUND OF SURVEYED VISITORS TO MON REPOS

	16-25	26-35	36-45	46-55	56-65	66-75	76-85	86>	N/R
Age group	111	136	124	80	34	19	1	-	14

	Primary only	Secondary	Completed year 10	Completed year 12	Trade certificate	Diploma	Degree	Postgraduate	Other	N/R
Education	08	12	49	95	54	59	180	59	1	2

	Self employed	Retired	Unemployed	Employed full-time	Schooling/University	Other training	Employed part-time	Housewife	other	N/R
Employment	81	29	41	208	33	02	68	32	23	02

	<20,000	20,000-30,000	31,000-40,000	41,000-50,000	51,000-60,000	61,000-70,000	71,000>	N/R
Income	170	51	70	50	36	26	54	62

The educational attainment of the respondents was well above that of the general population with most having tertiary qualifications. Almost half of the respondents had university degrees, including a substantial number with postgraduate degrees. This accords with previous findings of other researchers that demand for non-consumptive wildlife tourism and tourism/recreation in protected areas rises with levels of education. In general, one would expect a high degree of positive association between demand of ecotourism and the educational attainment of visitors. It may also be true that younger visitors tend to come from the homes of the better educated and have aspirations for further education but this could not be checked in this survey. To the extent that level of education is positively correlated with the level of present income or future income, ecotourism may be associated with the better educated and those whose life-time income prospects are above average. The results from this survey appear to be consistent with this hypothesis.

2.3 Visits to Mon Repos Conservation Park

Apart from sea turtle viewing on the beach at night, visitors to Mon Repos also visit the Mon Repos Conservation Park including the beach during daytime. This is important not only to attract more tourists to the area but also to retain the tourists in the area and for the further development of facilities at Mon Repos. Determining the number of beach users is also useful to assess the likely impact on sea turtle nests and to take preventive action.

The study showed that 38% of the respondents who come to view sea turtles visited the Mon Repos Conservation Park during the daytime. 45% of the respondents also visited the beach during the day. This is shown in Table 2.14.

A large number of respondents (55%) indicated that they were aware of the activities of QPWS connected with sea turtles before their visit to Mon Repos (Table 15). The birdlife in the Conservation Park is an attraction to visitors to Mon Repos. The Conservation Park also preserves Aboriginal middens and a Kanaka wall.

TABLE 2.14: NUMBER OF RESPONDENTS WHO VISITED THE BEACH AND MON REPOS CONSERVATION PARK DURING DAY TIME

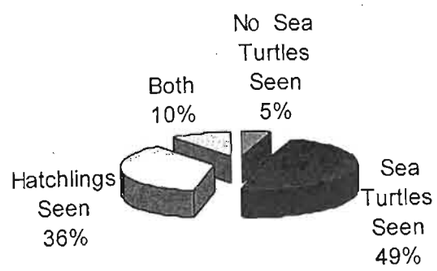
Number of visitors to Mon Repos Conservation Park during day time		
	Number	Percentage
Yes	197	38
No	322	62
Number of visitors to Mon Repos beach during day time		
	Number	Percentage
Yes	232	45
No	287	55
Mon Repos visitors awareness of sea turtle activities of QPWS		
	Number	Percentage
Yes	285	55
No	234	45

DISCUSSION AND RESULTS OF SURVEY PART II

2.4 Information about the sea turtle experience at Mon Repos Conservation Park

Section I of Part II was designed to determine whether visitors had seen sea turtles and/or hatchlings during their current visit. It must be noted here that during the first half of the sea turtle season, only adult sea turtles are seen. In the second half of the season, both sea turtles and hatchlings are seen and in the latter part of the season mainly hatchlings are seen. The viewing of sea turtles and/or hatchlings no doubt affects the perception of visitors' attitude to sea turtles and their conservation. Of those interviewed, a large number had seen sea turtles laying eggs and hatchlings emerging from their nests. Some respondents had seen both adult sea turtles as well as hatchlings. Less than 50 respondents had not seen sea turtles or any hatchlings during the current visit. From the data it is shown that visitors are more likely to see sea turtles or hatchling in the second half of the season than the first half of the season. This is because sea turtles are still nesting and at the same time hatchlings are emerging from their nests. Figure 2.5 shows the number of surveyed visitors seeing sea turtles/hatchlings at Mon Repos.

FIGURE 2.5: NUMBER OF VISITORS SEEING SEA TURTLES/ HATCHLINGS AT MON REPOS



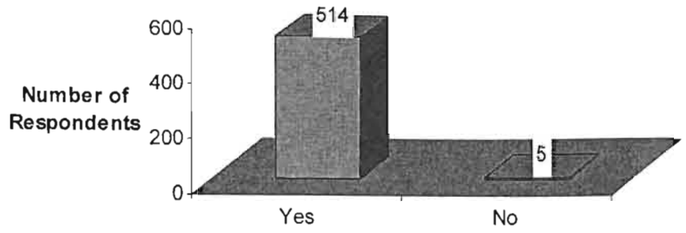
The largest number of sea turtles seen were loggerheads. Flatbacks and greens were also recorded but in very low numbers (Table 1.1). No leatherbacks were recorded during the 1999/2000 season.

2.5 Educational aspects

Non-consumptive wildlife-oriented recreational ecotourism not only provides economic benefits to the community but also has educational values, especially in educating the public about the threats affecting the wildlife that is being viewed. A good example is sea turtle viewing. Whilst visitors pay to observe one of nature's unique reproductive behaviours, they are also being educated on the dangers and threats while the eggs are being laid and/or the hatchlings are leaving their nests through an interpretative program. Display centres and amphitheatres such as at Mon Repos educate visitors on the threats faced by sea turtles and what action could be taken to minimize these threats. This is especially important not only for children but to the general public who may compete for the same resources as the sea turtles and/or those who unknowingly may be harming sea turtles due to their actions. A good example is using sea turtle nesting beaches for recreational purposes and the damage done by beach umbrellas.

In order to determine the educational aspects of sea turtle viewing, several questions were included in the questionnaire (Section 6, Part II). The responses obtained clearly demonstrate that sea turtle viewing imparted an educational experience to visitors who would otherwise not have experienced the egg laying spectacle of sea turtles and/or hatchlings leaving their nests. The visitor display centre, amphitheatre and the interpretative program conducted by the rangers and volunteers of the QNPWS were also informative and educational to the visitors. Of the surveyed respondents, 99% thought that sea turtle viewing at Mon Repos was informative and educational (Figure 2.6).

FIGURE 2.6: EDUCATIONAL VALUE OF SEA TURTLE VIEWING AT MON REPOS



The visitor centre displays (93%), amphitheatre (76%), information provided on the current threats (78%), the need to protect sea turtles (82%) and their life cycles (85%) were all considered educational. The interpretative program conducted by the rangers and volunteers also contributed in a major way to the understanding of the egg laying process (87%) and hatchling behaviour (90%) by the visitors. It is interesting to note that many visitors either learnt about the threats to sea turtles and biology of sea turtles for the first time or provided additional information because of the experience at Mon Repos (Table 2.15).

TABLE 2.15: VISITOR AWARENESS OF THREATS TO SEA TURTLES AND THEIR BIOLOGY FOLLOWING A VISIT TO MON REPOS

	Number of Respondents	Percentage
For the first time	163	31
Additional information	282	54
Knew most of it before	71	14
No response/Not sure	3	1
Total	**519**	**100**

The sea turtle viewing program educated and provided more information about threats to sea turtles such as sea turtles being harvested for consumption (56%), collecting of eggs for consumption (52%), threats from prawn trawlers (64%), entanglement in crab pots (55%), boats strikes (60%), fox/wild pig predation (59%), natural predators (e.g. goannas (45%), natural diseases (37%) and pollution of waterways (53%).

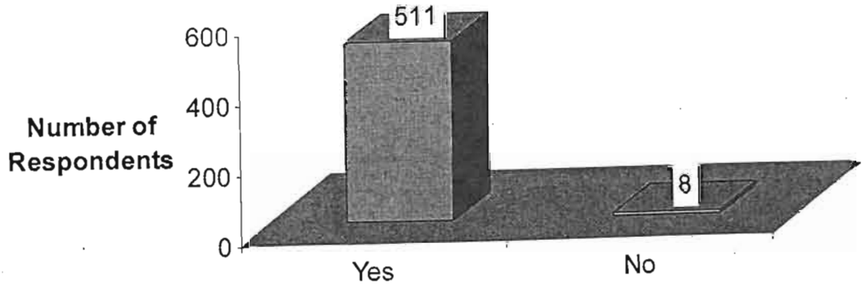
Apart from educating the visitors on the threats facing sea turtles, the experience at Mon Repos influenced respondents to be more careful in disposing of plastics (62%), fishing gear (47%), switching off lights near beaches (68%), while overseas refraining from buying/consuming tortoiseshell products, eggs, meat, soups (73%) and using beaches used by sea turtles for nesting (75%).

Sea turtle viewing also convinced the visitors about the urgency of protecting/taking action to conserve sea turtles in Australia and elsewhere. A large majority of the respondents (87%) were convinced of the need to take action to conserve sea turtles. Only 5% said they were not convinced about taking action to conserve sea turtles after their experience at Mon Repos. The rest were not sure (5%) or said the question was not applicable (3%). Similarly, those accompanying the respondent (e.g. children/partner/party) were also convinced about the urgency of protecting sea turtles (81%). Only 1% were not convinced while the rest were unsure (9%) or the question was not applicable (9%). This is important because if not for the sea turtle viewing experience, the threats facing sea turtles and the urgency to protect them would not have been known to many in the general public whose cooperation is essential if conservation measures adopted are to be successful. In recognition of the importance of the sea turtle interpretive centre the regional Business Development Scheme has provided further funds for its expansion and development in the next few years.

2.6 Conservation appreciation

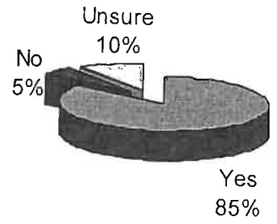
Sea turtle viewing also has conservation values. Because of the first hand encounters with sea turtles and/or hatchlings the task of demonstrating the plight of sea turtles and the threats facing them becomes more effective. Data collected from the survey revealed that the majority of respondents (98%) were convinced that more action should be taken to minimize threats to sea turtles (Figure 2.7). It was revealed that the desire to protect sea turtles increased after visiting Mon Repos. The reasons cited included: sea turtles are unique (90%), because they are ancient (66%), recreational value (32%) and they can generate income (23%). It was also found that after the visitors experience at Mon Repos, visitors were likely to report the sighting of sick turtles (66%), injured sea turtles (66%), poaching or mistreatment of sea turtles (88%).

FIGURE 2.7: NUMBER OF RESPONDENTS WHO WERE CONVINCED THAT MORE ACTION SHOULD BE TAKEN TO MINIMIZE THREATS TO SEA TURTLES AFTER THEIR EXPERIENCE AT MON REPOS



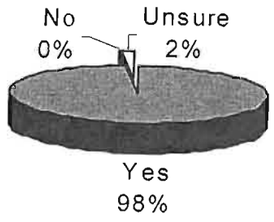
Furthermore, it was revealed that sea turtle viewing was a very satisfying experience and the majority of respondents (85%) wanted to return to Mon Repos (Figure 2.8). This confirms the satisfaction that was gained from viewing sea turtles at Mon Repos. The 15% who answered 'No' (5%) and 'Unsure' (10%) were mainly overseas visitors who thought the distance made them unlikely to visit Mon Repos again. Furthermore, a high proportion of respondents (98%) said that they would talk to their friends and relatives about their turtle-watching experience at Mon Repos, and presumably recommend a visit to them (Figure 2.9). These factors demonstrate the existence of a continued market for sea turtle viewing and strengthen the case for the further expansion and development of sea turtle viewing where appropriate, taking into consideration possible adverse impacts of sea turtle-based ecotourism.

FIGURE 2.8: NUMBER OF SURVEYED VISITORS WHO WISH TO RETURN TO MON REPOS



Many of the respondents who replied 'No/Unsure' were overseas visitors. Because of the distance they were not sure whether they could visit Mon Repos again. Furthermore, another conservation benefit from sea turtle-based ecotourism is that a considerable number of visitors were willing to pay for sea turtle conservation in Australia. This issue is discussed in more detail in a separate section.

FIGURE 2.9: NUMBER OF SURVEYED RESPONDENTS WHO WOULD TALK ABOUT SEA TURTLES AT MON REPOS TO FRIENDS AND RELATIVES



There are other conservation benefits in addition to those mentioned above. Revenue generated from sea turtle viewing is indirectly invested in sea turtle research at Mon Repos, patrolling nesting beaches (e.g. to prevent poaching, incidental destruction of eggs by beach users) and conducting programs for the eradication of predators of sea turtle eggs and hatchlings. Since 1995 a fox, *Vulpes vulpes*, baiting program has been running at Mon Repos Conservation Park. This program has been successful in reducing the number of foxes within the area as well as reducing the incidence of foxes destroying nests. This is an ongoing program throughout the year where baits are checked and set regularly.

The Queensland Sea Turtle Research Program first commenced at Mon Repos in 1968 and since then has become one of the important places where intensive research is being carried into the biology, reproductive and migration studies of tagged sea turtles, annual surveys of nesting turtles, behavioural studies, incubation studies and conservation of sea turtles in Australia. The Mon Repos program was expanded in 1974 to include the Heron Island rookery. Experiences gained at Mon Repos now guide research at other major Queensland rookeries including Wreck, Raine, Bountiful, and Milman Islands (Kay, 1995). In addition, Mon Repos is an important training centre for research program volunteers and wildlife managers from Australia and the Indo-Pacific region. Volunteers from Mon Repos assist sea turtle research throughout Queensland. International managers learn skills and techniques which they can employ in their own countries' sea turtle research and management activities. As Australia shares its sea turtle populations with neighbouring countries, Mon Repos' international training function is very important for promoting co-operative and informed joint management of the Indo-Pacific sea turtle populations (ibid). Furthermore, sea turtle viewing activities at Mon Repos played a crucial role in forestalling a proposed real estate development which would have seen the establishment of a road on the foreshore of the beach with disastrous environmental consequences for the sea turtle rookery. Furthermore, the Woongarra Marine Park was declared in December 1991 mainly to protect sea turtles in their inter-nesting habitat offshore from Mon Repos during the breeding season.

Apart from the above mentioned benefits, there are potential benefits to be derived from sea turtle viewing at Mon Repos. Many visitors indicated their desire to subscribe to a newsletter with updates on the conservation work carried out at Mon Repos and elsewhere with regard to sea turtles. Some respondents indicated the need to form a 'friends of sea turtles' group that could be involved in conservation work. Support from such a group can be effective in promoting the message of conservation. A good example is the Royal Society for the Protection of Birds (RSPB) in Britain which started as a small group and today it has grown to over a million members. It is now one of the main influential conservation pressure groups in Britain. RSPB also influences conservation decision making in Europe. Respondents also indicated their desire to have more access to material on sea turtles, current threats to sea turtles in Australia and elsewhere and the conservation measures undertaken. Relevant material translations into other languages were also requested.

Sea turtle viewing also raises the possibility of introducing a scheme whereby sea turtles can be adopted by the public in return for a donation. Updates can be provided to sponsors whenever information is available. With sea turtle tagging and monitoring

taking place, the provision of information to those adopting sea turtles becomes possible, although the time taken between information provided may be long.

2.7 Entrance fee

This section examines what respondents said visitors ought to pay and what they are willing to pay to view sea turtles at Mon Repos. Although organized sea turtle viewing has been in existence for almost three decades at Mon Repos, the introduction of entrance fees is a new phenomenon. An entrance fee was introduced at Mon Repos for the first time in 1993/1994 season after the construction of the information centre to complement the sea turtle-watching program. The entrance fees were introduced as a user-pay system so that the centre was self sufficient in its workings (per. com). The fees are determined by the QPWS and are categorized into four groups of visitors, namely, adult, family and children (5-15) and pensioners. The 1999/2000 entrance fees for the four groups are shown in Table 2.16.

TABLE 2.16: NIGHTLY FEES DURING SEA TURTLE SEASON AT MON REPOS (MID NOVEMBER/MARCH)

Single visit ticket	Aus $	Season ticket	Aus $
Child (5-15)	2	Child (5-15)	5
Pensioner	2	Pensioner	5
Adult	4	Adult	10
Family	10	Family	25
School Groups	1		

Source: Queensland Department of Environment and Heritage, 1999, p. 3.

In order to determine the opinions of visitors about the entrance fee to Mon Repos Conservation Park for the purpose of turtle viewing, visitors were asked two questions. One was aimed at determining how much visitors thought they **ought** to pay (a normative question) for sea turtle viewing and the other was aimed at how much they were **willing to pay** (a positive question) for sea turtle viewing. The questions were framed as follows:

[1] What do you think the single entrance fee **ought** to be to watch sea turtles (including guided tours by staff, visitors, visitor centre and amphitheatre)?

Adult [Aus$] Family [Aus$] Child/Pensioner [Aus$]

[2] What is the single maximum fee you are **willing to pay** to watch sea turtles (including guided tours by QNPWS staff, visitor centre and amphitheatre)?

For your self alone [Aus$] For whole family (if applicable) [Aus$]

The demand for viewing sea turtles is reflected in the entrance fee the visitors thought they ought to pay and are willing to pay for the four group categories. The responses obtained are shown in Tables 2.17 and 2.18.

TABLE 2.17: ENTRANCE FEES RESPONDENTS THOUGHT THEY OUGHT TO PAY

Adult Entrance Fee	Number of Respondents	Family Entrance Fee	Number of Respondents	Child/Pensioner Entrance Fee	Number of Respondents
00	02	00	02	00	09
02	03	02	01	01	03
03	06	03	01	02	138
04	152	04	03	2.5	14
4.5	03	05	03	03	54
05	107	06	03	04	33
06	22	08	08	05	58
07	07	09	01	06	09
7.5	03	10	158	07	02
08	28	12	19	08	06
09	02	12.5	02	09	02
10	84	13	01	10	07
12	01	15	51	25	01
12.5	01	16	02	NR	183
15	09	1705	02		
20	03	18	02		
25	01	20	51		
40	01	21	01		
45	01	25	33		
NR	83	26	02		
		27	01		
		30	12		
		35	01		
		40	03		
		45	02		
		50	02		
		70	02		
		NR	150		
Total	**519**	**Total**	**519**	**Total**	**519**

NR = No Response

On average the respondents thought that the entrance fee ought to be 5 dollars for adults to view sea turtles at Mon Repos. This amount is 1 dollar more than the existing entrance fee. The surveyed family visitors thought that they ought to pay an average of 15.25 dollars which is 5.25 dollars more than the existing entrance fee. The average fee which the respondents thought they ought to pay for a child/

pensioner was 3.35 dollars which is 1.35 dollars more than the existing amount (Table 2.17).

The study also determined how much visitors are willing to pay for an adult to view sea turtles. Interestingly respondents on average were willing to pay more than the existing entrance fees and what they said they thought they **ought** to pay for an adult and family groups (Table 2.18).

TABLE 2.18: ENTRANCE FEES RESPONDENTS WERE WILLING TO PAY TO VIEW SEA TURTLES AT MON REPOS

Adult Entrance Fee	Number of Respondents	Family Entrance Fee	Number of Respondents
00	03	00	02
02	06	02	01
03	03	04	01
04	46	4.5	01
4.5	01	05	01
05	104	08	03
06	21	10	74
6.5	01	11	01
07	11	12	09
7.5	05	15	51
08	22	17.5	02
09	03	18	03
10	148	20	51
12	07	22	01
12.5	01	25	29
14	01	30	15
15	28	35	02
20	25	40	10
25	05	50	07
30	03	60	01
40	01	70	01
50	02	100	02
60	01	120	01
100	01	NR	250
NR	70		
Total	**519**	**Total**	**519**

NR = No Response

The surveyed visitors' average willingness to pay for an adult and family was 8.95 dollars and 19.47 dollars respectively which is more than double the existing fee for an adult and 9.47 dollars more than the existing fee for a family. The visitors 'ought to pay' and 'willingness to pay' average amounts clearly demonstrate the satisfaction of visitors experiencing a rare and a unique event.

It should, however, be noted that a small minority of respondents indicated that fees ought to be lower than those charged in 1999/2000 and indicated they would be unwilling to pay these fees for a visit in the future, or if they had known what they would get for their money. Possibly the majority of these dissatisfied respondents failed to see sea turtles – sightings of sea turtles are not guaranteed and payment is not refunded in the event of no turtles being available for viewing.

For those visiting Mon Repos for the first time (78%), it is likely that apart from the risk of not seeing turtles nesting or hatchlings emerging, turtle watching was an experiential good for most. Most visitors to Mon Repos probably have had no previous experience of sea turtle watching and 78% certainly had not previously had this experience at Mon Repos. The experiential nature of the good (cf. Casson, 1982) is probably one of the reasons why so many visitors relied on recommendations from others in making their visit.

The demand curve based on willingness to pay is the ex post rather than the ex ante one. It really indicates what visitors would have been willing to pay in hindsight, that is given their experience at Mon Repos, and possibly also is indicative of the strength of the recommendation which they might give to other potential visitors.

2.8 Recreational value of sea turtle viewing at Mon Repos

In this section, we measure the consumer or recreational surplus of visitors to Mon Repos Conservation Park who came to view sea turtles. Consumer surplus in recreational activities can be defined as the net benefit to the visitor to a recreational site after paying an entry fee. In other words it is the difference between what an individual is willing to pay for a recreational activity and the price actually paid. For example, in the case of sea turtle viewing at Mon Repos the recreational value would be the amount an individual and/or family is willing to pay to view sea turtles and the actual entrance fee charged for individuals and families. The surplus shows the satisfaction of individuals of visiting a recreational site. Unpublished data of QPWS for ticket sales in December 1999 showed that 2,593 adult, 420 family, 389 to children entering other than on family tickets, and 189 pensioner tickets were sold. Assuming that on average families consisted of 4.5 persons, this data indicates that about 51.23% of persons entered on adult tickets, 37.3% on family tickets and about 11.4% on pensioner or children's tickets. Using the above figures for consumer's surplus for adults and families (those on pensioner and children's tickets excluded) and supposing that the composition of ticket sales remained the same for the 1999/2000 season as in December 1999, the total consumers' surplus generated by visits for turtle-watching in the 1999/2000 season (pensioner's and children's ticket-holders excluded) is approximately Aus $77,722. If the receipts from ticket sales to pensioners and children are added, total value of ticket sales for the 1999/2000 season is Aus $72,728. It is clear that the level of consumers' surplus generated by visits to watch turtles exceeds income from fees. Table 2.19 sets out the maximum amounts

which respondents said (ex post) they would be willing to pay to visit Mon Repos for turtle viewing and the resulting consumer surplus for the surveyed respondents. This table must be interpreted carefully. While one might derive the ex post demand curve from it, it is unlikely to yield the ex ante demand curve. Furthermore, it does not represent the demand for a further visit or is unlikely to do so. But it does indicate the extent of the consumers' surplus of visitors following their visit (it is interesting to note that the surveyed respondents on average spent 3.8 hours waiting to view the sea turtles). Furthermore, it suggests that the existing entry charge could possibly be raised without a substantial fall in demand, especially if those who fail to see turtles could be given an opportunity to visit again free of charge.

TABLE 2.19: MAXIMUM ENTRANCE FEES (AUS $) WHICH RESPONDENTS SAID EX POST THAT THEY WOULD BE WILLING TO PAY FOR THE SEA TURTLE EXPERIENCE AT MON REPOS

Adult Entrance Fee	Number of Respondents	Adult Visitors' Consumer Surplus	Family Entrance Fee	Number of Respondents	Family Visitors' Consumer Surplus
00	03		00	02	
02	06		02	01	
03	03		04	01	
04*	46		4.5	01	
4.5	01	0.5	05	01	
05	104	104	08	03	
06	21	42	10*	74	
6.5	01	2.5	11	07	07
07	11	33	12	09	18
7.5	05	17.5	15	51	255
08	22	88	17.5	02	15
09	03	15	18	03	24
10	148	888	20	51	510
12	07	56	22	01	12
12.5	01	8.5	25	29	435
14	01	10	30	15	300
15	28	308	35	02	50
20	25	400	40	10	300
25	05	105	50	07	280
30	03	78	60	01	50
40	01	36	70	01	60
50	02	92	100	02	180
60	01	56	120	01	110
100	01	96	NR	250	-
NR	70	-			
Total	**519**	**AUS $ 2,436**	**Total**	**519**	**AUS $ 2,606**

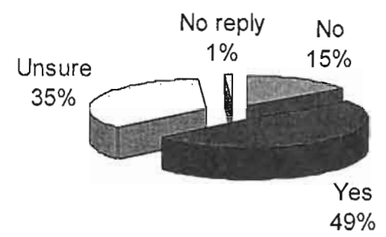
* Entrance Fee at time of survey

It is clear that the overwhelming majority of respondents after their experience obtained an economic surplus, and for most this was a significant surplus and the visit represented value for money.

2.9 Contributions for sea turtle conservation

Apart from the higher average amounts which respondents thought they ought to pay and were willing to pay as entrance fees to view sea turtles, the experience had a positive influence on visitors willingness to contribute money to sea turtle conservation. A considerable percentage of responding visitors (40%) said that their visit to Mon Repos will influence them to contribute more money for sea turtle conservation than before. 27% said they would contribute the same amount as prior to their visit to Mon Repos, whereas only 1% said they would contribute less. However, 32% did not answer this question. Figure 2.10 shows the number of respondents who were influenced by the Mon Repos experience to contribute money for sea turtle conservation. They were of the opinion that the experience at Mon Repos influenced them to make a contribution to sea turtle conservation in the future. This is another positive aspect of sea turtle viewing apart from the educational, conservation and entrance fees generated from sea turtle viewing.

FIGURE 2.10
INFLUENCE OF THE MON REPOS EXPERIENCE TO CONTRIBUTE MONEY FOR SEA TURTLE CONSERVATION



In order to determine how much money visitors were willing to pay for sea turtle conservation, the study adopted the contingent valuation approach to obtain bids from visitors to Mon Repos. In the next section we discuss the contingent valuation approach and the findings.

In addition, there is the potential to earn extra revenue from other activities. For example, it was suggested by some respondents that certain activities to 'occupy' children. One suggestion was to provide children with material for drawing and colouring with a sea turtle theme. The setting up of a food outlet was suggested. Sale of photographs in addition to the ones already on sale was also mentioned. Some respondents even suggested the banning of photography whilst the turtles were nesting to minimise the disturbance and instead requested purchasing them at the display centre.

2.10 Economic valuation analysis

The contingent valuation method is used to determine how much visitors to Mon Repos were willing to pay to protect sea turtles that come to nest in Australia. The contingent valuation method (CVM) was originally designed to value non-market goods where individuals are asked directly what they would like to pay for a good, hypothetically assuming that there could be a market for the good in question. This technique has been applied for the valuation of a very large number of non-market goods such as the environment, the value of recreation and pollution and non pollution related health effects. Whittington (1998. p. 29) points out that the CVM can be applied to obtain values of pure public goods, goods with both private and public characteristics and private goods. CVM in the 1990s is a well-established and widely applied technique for valuing non-market goods and is supplemented by other direct techniques of measuring non-market goods. The contingent valuation method is a direct approach to valuing non-market goods.

Since the CVM was proposed by Davis (1963), it has been widely used during the last thirty five years or so to estimate economic values for a range of commodities for which there is no market[1]. In the last decade, however, there has been a dramatic increase in the number of academic papers and presentations relying on contingent valuation. These works have dealt with the methodological issues concerning the CVM and debated the advantages and disadvantages of each approach.

The CVM is the most frequently used of the constructed market techniques employed in the United States to settle environmental disputes in courts in environmental law suits, especially in estimating lost passive-use values (a good example, is the Ohio State vs. Department of the Interior court case of damage assessments), by many government agencies of many countries such as Australia, Canada and Norway. In Australia the CVM has been increasingly used and some major studies conducted using this approach include: the Kakadu Conservation Zone inquiry (Imber et al., 1991); Institute of Applied Environmental Research (1990) study to assist with the inquiry into the conservation, management and the use of Fraser Island and the Great Sandy region.

The contingent valuation questions used in the survey, except one, were based on the dichotomous choice model. That is, Yes/No responses are elicited to several questions in relation to their willingness to pay to protect sea turtles that come to nest in Australia. The final contingent valuation question was an open ended question where the respondents were asked the maximum amount per week they were willing pay to protect sea turtles that come to nest in Australia for the next ten years. The contingent valuation questions were made optional for overseas visitors. Prior to the contingent valuation questions, respondents were given a brief introduction about the costs involved with the conservation of sea turtles. The respondents were also reminded that paying for sea turtle conservation is only one of many environmental issues which may cost money to the respondent and that this may have to come from the family budget. The contingent valuation questions that were asked were as follows:

[1] For example, Carson (personal comm. 1998) states that more than 2,500 studies have been carried out in more than 50 countries using this method.

Conserving sea turtles costs money. In order to meet the costs of conservation, money will have to be raised by the government (Please bear in mind that this is only one of many environmental issues which may cost you money and that this may have to come from your/family budget). These questions are being asked to determine how much individuals are willing to pay for sea turtle conservation and not to raise money for Mon Repos.

8.1 Would you be willing to have your take-home income reduced by $2 dollars a week, that is $100 per year, for the next ten years to protect sea turtles that come to nest in Australia?

Yes ☐ No ☐ If No, go to Q.8.3

8.2 What if the cost of protecting sea turtles turned out to be higher, would you be willing to have your take-home income reduced by $5 dollars a week, that is $250 per year, for the next ten years to protect sea turtles that come to nest in Australia?

Yes ☐ No ☐

8.3 If the cost of protecting sea turtles turned out to be lower than indicated above, would you be willing to have your income reduced by $1 dollar a week, that is $50 per year, for the next ten years?

Yes ☐ No ☐

If No, what are the reasons 1. ..... 2. ..... 3.....

8.4 In order to protect sea turtles that come to nest in Australia what is the **maximum** amount you would be willing to pay per week for the next ten years? (Please bear in mind that this is only one of many environmental issues which may cost you money and that this may have to come from your/family budget).

$..... dollars a week

Of the 519 useable survey forms used in the analysis, 374 respondents answered this question. 285 Australians answered this question while 29 did not. Although this question was optional to foreigners, 89 answered this question while 116 did not. Out of the respondents who answered the valuation question, there were 71 zero bids (63 Australians and 8 foreigners) and 33 protest bids (25 Australian and 8 foreigners). Out of the 71 zero bids, 25 Australians and 6 foreigners gave reasons for doing so. The reasons are given below (Table 2.20).

Table 2.20: REASONS FOR ZERO BIDS

Reason	Number
Contribute to other charities	09
Unemployed	03
Pensioner	05
Cannot afford	13
Student	01
Total	31

It is clear that the reasons for giving zero bids was because the 31 (8%) respondents had other commitments such as making contributions to other charities, they were unemployed, pensioners, students or because their present income was insufficient to make a contribution to sea turtle conservation. However, a distinction can be made between those who give zero bids and protest bids. Out of the 374 respondents who answered the question regarding their willingness to pay for sea turtle conservation, there were 33 respondents (8%) who gave zero bids. Zero bids were given for reasons other than protesting against making a payment for sea turtle conservation, such as being unemployed and insufficient income. On the other hand, protest bids are given in order to protest against voluntary payment. Some of the reasons for giving protest bids in the study were that they were already paying taxes and government should pay for conservation. The reasons for protest bids are shown in Table 2.20.

TABLE 2.21: REASONS FOR PROTEST BIDS

Reason	Number
Paying taxes	07
Government should provide for protection	04
Reduce government waste and pay for protection	04
Lobby MP's	01
There are other more important causes	04
Too many animal causes	06
Nature can take care of itself	01
Voluntary donations preferred	04
Have paid entrance fees	02
Total	33

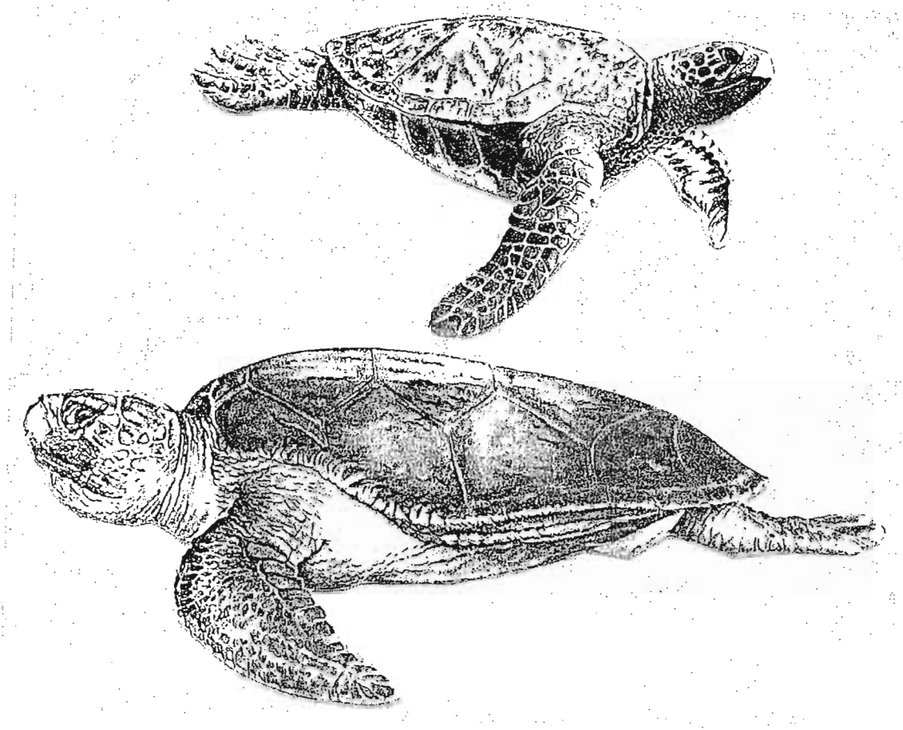
Those who gave non-zero bids (268) were willing to pay Aus $2.49 on average a week to protect sea turtles in Australia. When the 71 zero bids are included, the average amount the visitors were willing to pay was 1.97 dollars per week. The breakdown for Australians and foreigners is shown in Table 2.22.

TABLE 2.22: AVERAGE WEEKLY WILLINGNESS TO PAY TO PROTECT SEA TURTLES IN AUSTRALIA

Group	Aus $
Australians and Foreigners combined (with zeros)	1.97
Australians and Foreigners combined (without zeros)	2.49
Australians (with zeros)	2.15
Australians (without zeros)	2.43
Foreigners (with zeros)	2.53
Foreigners (without zeros)	2.67

On average foreigners were willing to pay a slightly higher figure for sea turtle conservation than Australians. This may be due to the favourable exchange rate enjoyed by many foreign visitors to Australia, especially those from the U.K and North America at the time of the survey. For example, Australians (when zero bids were included) were willing to pay Aus $2.15 a week while foreigners (when zero bids are included) were willing to pay Aus $2.53 a week. Australians (without zero bids) were willing to pay Aus $2.43, while foreigners (without zero bids) were willing to pay Aus $2.67 a week. It can be inferred that the visitors to Mon Repos for the 1999/2000 season involved in sea turtle viewing would be prepared to pay at least Aus $250,000 per year to protect sea turtles in Australia. When this is combined with the willingness to pay by turtle watchers from previous years plus the willingness of some non-visitors to pay for protection of turtles, considerable collective economic value is clearly placed on the conservation of Australian marine turtles. This can also be expected to translate into political support for state programmes for the conservation of marine turtles.

SEA TURTLES AND ECOTOURISM SURVEY – MON REPOS



Purpose of this study: Sea Turtles are endangered. Your answers to the survey will assist with the economic management of their conservation. This study is being conducted by the Department of Economics, University of Queensland in collaboration with the CRC for Sustainable Tourism and the Queensland National Parks and Wildlife Service (QNPWS). For further information contact Professor Clem Tisdell or Dr Clevo Wilson, telephone(07) 33656570

Please contribute by completing this survey form. Your answers will be used for statistical purposes only and are strictly confidential

Instructions: The survey form is in two (2) parts. Part I (on yellow paper) can be completed before viewing sea turtles at Mon Repos. Part II (on white paper) should be completed after viewing sea turtles at Mon Repos. However, if sea turtles fail to be seen, then complete only what is applicable in Part II.

Completed survey forms can be handed to any Mon Repos ranger/volunteer or posted without delay in the self addressed envelope provided (postage prepaid)

Survey facilitator at Mon Repos is Leeann Evans

Note: Please delete/circle where necessary and tick ☐ appropriate boxes

PART I (BACKGROUND INFORMATION)

1. Information on Your Current Visit to Watch Sea Turtles at Mon Repos Conservation Park

1.1 Date of visit ------- ------- -------
Day Month Year

1.2 What is your home district/town ☐ State ☐ Country ☐

1.3 Are you/your family/party on: Holiday ☐ Local day-tripper ☐ Any other

1.4 Have you visited Mon Repos before? Yes ☐ No ☐ If Yes, how many times? ☐

1.5 How many in your party travelled to Mon Repos Conservation Park? ☐

Respondent ☐ Partner ☐ Children ☐ Relations ☐ Friends ☐

1.6 Was the trip to Mon Repos Conservation Park: A family outing to watch sea turtles ☐
Entertain visitors (e.g. friends) ☐
To study sea turtles ☐
Any other (please specify) 1.....

1.7 Mode of transport (eg. Car, Coach) to Bundaberg .....To Mon Repos .....

1.8 How did you get to know about Mon Repos sea turtles?

Mass Media (please specify) 1. ..... 2. ..... 3 ☐
QNPWS brochures ☐
Word of mouth ☐
From previous visit ☐
Any other (please specify) 1. ..... 2. 3

1.9 On the night before you arrived in Mon Repos, what town or locality did you stay at?

Town or Locality .....

1.10 How many km approximately is this place from Mon Repos? .....

1.11 Where will you stay tonight (town/locality)? .....

1.12 How many nights have you or do you intend staying in: ☐
[a] The Bundaberg area (within 60 km radius of Bundaberg) ☐
[b] The Turtle Sands Caravan Park

1.13 If it were **NOT** for the presence of sea turtle viewing at Mon Repos, would you/family/party have visited the Bundaberg (within 60 km radius) area?

Yes ☐ No ☐

1.14 If **YES,** would you have **reduced your stay** within 60 km radius of Bundaberg if there were no sea turtles in this area?

Yes ☐ No ☐

1.15 If Yes, by how many days ☐

1.16 If it were **NOT** for the presence of sea turtle viewing at Mon Repos, would you/family/party have visited Mon Repos?

Yes ☐ No ☐

1.17 If **YES,** would you have **reduced your stay** in Mon Repos if sea turtles did not occur there?

Yes ☐ No ☐

1.18 If Yes, by how many days?

1.19 How many nights will you/family/party spend watching sea turtles on this visit? ☐

1.20 Was this visit to view sea turtles the **main** purpose of your trip today? Yes ☐ No ☐

1.21 If **No,** what were the other main sites visited today? 1.....2.....

1.22 If other sites/places were visited or if you intend to visit others **during** this **journey away from home,** please specify

Beach ☐ Theme parks ☐ Museums ☐ National Parks/Nature Reserves ☐

Any other place (please specify) 1. ..... 2. .....3.....

1.23 How many nature-based trips have you/your family undertaken during the last 12 months?

Number of trips	District/State	Country	Name of Reserve/Sanctuary/National Park
.....	.....	.....	.....
.....	.....	.....	.....
.....	.....	.....	.....

2. Costs Involved with the Current Trip to Watch Whales

2.1 How much expenditure did you/family/party incur **a day** while you were in the Bundaberg (within 60 km radius) area? [Please state approximate costs such as accommodation, food, travelling (fuel, coach,), souvenirs purchased, theme parks visited, etc]

A$ (approx) .....per day

2.2 How much expenditure did you/family/party incur **a day** while you were in Mon Repos? Please state approximate costs such as food, travelling (fuel, taxi), souvenirs purchased, park entrance fee, etc]

A$ (approx) .....per day

3. Socio-Economic Data

3.1 How old were you/family/party at the time of the trip?

	Respondent	Partner	Children 1	Children 2	Children 3	Children 4	Others 1	Others 2	Others 3	Others 4
	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
3.2 Gender	M/F	M/F	M/F	M/F	M/F	M/F	M/F	M/F	M/F	M/F

3.3 Indicate your highest qualifications?

Primary only ☐ Some secondary schooling ☐ Completed year 10 secondary ☐

Completed year 12 secondary ☐ Trade certificate ☐ Diploma ☐

Degree ☐ Post-graduate degree ☐ Any other (1)

3.4 At the time of the trip, were you:

Self Employed ☐ Retired ☐ Unemployed ☐

Employed full-time ☐ Schooling/University ☐ Other training ☐

Employed part-time ☐ Housewife ☐ Any other (1)

3.5 What is your approximate gross income?

Your partner's income?			
Less than $20,000	☐	Less than $20,000	☐
$20,001-30,000	☐	$20,001-30,000	☐
$30,001-40,000	☐	$30,001-40,000	☐
$40,001-50,000	☐	$40,001-50,000	☐
$50,001-60,000	☐	$50,001-60,000	☐
$60,001-70,000	☐	$60,001-70,000	☐
$70,001>	☐	$70,001>	☐

***Note:** If an overseas visitor please state your approximate gross income in your own currency

Your income ..... Partner's income .....

4. About Mon Repos Conservation Park

4.1 Have you/family/party visited the Mon Repos Conservation Park during the daytime or is your intention to visit by day?

Yes ☐ No ☐

4.2 Have you/family/party visited the Mon Repos beach during the daytime or is such a visit intended?

Yes ☐ No ☐

4.3 Were you aware of the activities of the QNPWS connected with sea turtles before your visit to Mon Repos?

Yes ☐ No ☐

PART II

INFORMATION ABOUT YOUR WHALE WATCHING EXPERIENCE AT MON REPOS CONSERVATION PARK

Note: Please fill in this section after viewing the visitor centre displays, amphitheatre and sea turtles. However, if no sea turtles or hatchlings have been seen, then complete only what is applicable on completion of your visit.

5. Information About Sea Turtles

5.1 How many adult sea turtles did you/your family/party see on this entry to park ☐

5.2 What were they? Loggerheads ☐ Greens ☐ Flatbacks ☐ Cannot remember ☐

5.3 Did you see hatchlings? Yes ☐ No ☐

6. Educational Aspects

6.1 Was your visit to Mon Repos Conservation Park to watch sea turtles informative?

Yes ☐ No ☐

6.2 What was 'educational'?
(1) Visitor centre displays ☐
(2) Amphitheatre ☐
(3) Watching the sea turtles laying eggs ☐
(4) Watching the hatchlings ☐
(5) Information on current threats ☐
(6) Information on the need to protect turtles ☐
(7) Information on turtle-life cycles ☐
(8) All of the above ☐

6.3 Did the interpretative program conducted by the QNPWS staff on the beach contribute to your understanding of:
(1) The egg laying process of sea turtles Yes ☐ No ☐ Unsure ☐
(2) Hatchling behaviour Yes ☐ No ☐ Unsure ☐

6.4 Did you learn about the threats/biology of sea turtles:
(1) For the first time ☐
(2) Additional information ☐
(3) Knew most of it before ☐

6.5 Did the sea turtle watching programme educate you about/provide more information on any of the following threats to sea turtles?
(1) Turtles harvested for consumption ☐
(2) Collecting turtles eggs for consumption ☐
(3) Threats from prawn trawlers ☐
(4) Entanglement in crab pots ☐
(5) Boat strikes ☐
(6) Fox predation/wild pig predation ☐
(7) Natural predators (e.g. Goannas) ☐
(8) Natural diseases ☐
(5) Pollution of waterways ☐

6.6 Do you think your experience at Mon Repos will influence you to be more careful with:
(1) Disposing of plastics ☐
(2) Fishing gear ☐
(3) Switching off lights near beaches ☐
(6) While overseas,refraining from buying/consuming tortoiseshell products, eggs,meat, soups, etc ☐
(7) Using beaches used by sea turtles for nesting ☐

6.7 Did your experience at Mon Repos convince you about the urgency of protecting/taking action to conserve sea turtles in Australia and elsewhere?

Yes ☐ No ☐ Unsure ☐ Not Applicable ☐

6.8 Do you think the experience at Mon Repos convinced your children/partner/party about the urgency to protect/to take action to conserve sea turtles in Australia and elsewhere?

Yes ☐ No ☐ Unsure ☐

7. Conservation Appreciation

7.1 Do you think that after your experience at Mon Repos you were convinced that more action should be taken to minimize the threats facing sea turtles?

Yes ☐ No ☐ Unsure ☐

7.2 Did your visit increase your desire to protect sea turtles for their:
Uniqueness ☐
Because they are ancient ☐
Recreational value ☐
Can generate income ☐
All of the above ☐
Other (specify)..... ☐

7.3 From your experience at Mon Repos, are you likely to report:
The sighting of a sick turtle ☐
Injured turtle ☐
Poaching or mistreatment of sea turtles ☐

7.4 What do you think the single entrance fee **ought** be to watch sea turtles (including guided tours by QNPWS staff, visitor centre and amphitheatre)?

Adult A$ ☐ Family A$ ☐ Child/Pensioner A$ ☐

7.5 What is the single maximum fee you are **willing to pay** to watch sea turtles (including guided tours by QNPWS staff, visitor centre and amphitheatre)?

For yourself alone A$ ☐ For whole family (if applicable) A$ ☐

7.6 Have you donated money at Mon Repos for sea turtle conservation?

Yes ☐ No ☐

7.7 Do you think your experience at Mon Repos will influence you to contribute money for sea turtle conservation?

Yes ☐ No ☐ Unsure ☐

If **No** what are the reasons 1. ..... 2. ..... 3.....

7.8 How much time did you/family/party spend viewing sea turtles today? (Please include the waiting time as well as the time spent in the display centre and amphitheatre)

.....hours

7.9 Would you visit Mon Repos again? Yes ☐ No ☐ Unsure ☐

If **No/Unsure** what are the reasons?

(1) Facilities are inadequate ☐
(2) Don't like sea turtles ☐
(3) Children did not like sea turtles ☐
(4) Mon Repos was not interesting ☐
(5) Time is inconvenient ☐
(6) Did not (a) see sea turtles ☐
(b) see hatchlings ☐
(7) Any other (please specify) (a) ..... (b)..... ☐

7.10 As a result of your experience at Mon Repos will you and family talk about Mon Repos to relatives and friends?

Yes ☐ No ☐ Unsure ☐

If **No/Unsure** what are the reasons (a) .....(b) .....

7.11 What was special about sea turtle watching at Mon Repos? (1) .....
(2) .....
(3) .....

7.12 What can be done to improve the facilities at Mon Repos to increase their:
Educational Value (1) .....
Conservation Value (2) .....
Other suggestions .....

8. Valuation Questions

Applicable to Australians (optional for overseas visitors)

Conserving sea turtles costs money. In order to meet the costs of conservation, money will have to be raised by the Government. ***These questions are being asked to determine how much individuals are willing to pay for sea turtle conservation and not to raise money for Mon Repos***(Please bear in mind that this is only one of many environmental issues which may cost you money and that this may have to come from your/family budget).

8.1 Would you be willing to have your take-home income reduced by $2 dollars a week, that is $100 per year, for the next ten years to protect sea turtles that come to nest in Australia?

Yes ☐ No ☐ If No, go to Q.8.3

8.2 What if the cost of protecting sea turtles turned out to be higher, would you be willing to have your take-home income reduced by $5 dollars a week, that is $250 per year, for the next ten years to protect sea turtles that come to nest in Australia?

Yes ☐ No ☐

8.3 If the cost of protecting sea turtles turned out to be lower than indicated above, would you be willing to have your income reduced by $1 dollar a week, that is $50 per year, for the next ten years?

Yes ☐ No ☐

If No, what are the reasons 1. ..... 2. ..... 3.....

8.4 In order to protect sea turtles that come to nest in Australia what is the **maximum** amount you would be willing to pay per week for the next ten years?

Aus $ .....

8.5 Following your visit to Mon Repos, are you willing to pay More ☐ Less ☐ Same ☐ for sea turtle conservation as before your visit?

For verification purposes only

Your First Name: .....Surname:..... .....Tel. No. .....

9. Additional Comments

Please give the completed survey to the Mon Repos rangers/volunteers or post it without delay in the self addressed envelope provided (postage prepaid)

THANK YOU FOR YOUR COOPERATION

Note: If for some reason the attached envelope is missing, our postal address is: Sea Turtle Survey, (Attention: Dr Clevo Wilson), Department of Economics, The University of Queensland, Brisbane, 4072, Australia.

CHAPTER 3

SUMMARY OF DISCUSSION AND RESULTS OF SURVEY

3.1 Mon Repos Conservation Park

Mon Repos Conservation Park which is located 15 km from the town of Bundaberg is 45 hectares in size and protects approximately 1 km of the leeward side of the Mon Repos beach which supports one of the largest nesting sea turtle rookeries on the eastern Australian mainland. Mon Repos is one of the largest loggerhead nesting beaches in the South Pacific Ocean region. During the last 4 seasons 183 loggerheads nested at Mon Repos. Greens (2) and Flatbacks (6) also nested at Mon Repos during this period. No records are available for the giant leatherbacks. Mon Repos has pioneered sea turtle research in Australia and for more than three decades has become one of the most important places in Australia and elsewhere where intensive research is being carried out into the biology, reproductive and migration behaviours of tagged sea turtles, annual surveys of nesting turtles, behavioural studies, incubation studies and conservation of sea turtles. Experiences gained at Mon Repos now guide research at other major Queensland sea turtle rookeries. Mon Repos is also an important training centre for research volunteers and wildlife managers from Australia and the Indo Pacific region. International managers learn skills and techniques which they can employ in their own countries' sea turtle research and management activities.

3.2 Mon Repos visitors' profile

In addition to the sea turtle research being conducted at Mon Repos, it is the most accessible and well developed sea turtle rookery in Australia for sea turtle-based ecotourism. During the last seven seasons an average of 19,426 visitors a year were recorded at Mon Repos. The number of visitors for the 1999/2000 season was 23,485. In the surveyed group, there were visitors from 18 nationalities and the majority of them, as expected, were from Australia. A considerable number of European tourists visited Mon Repos. For example, there were significant numbers of visitors in the sample from the U.K, Germany, Netherlands and Switzerland. North Americans also visited Mon Repos in quite significant numbers. The number of Asian visitors was almost negligible. Statewise, most surveyed visitors to Mon Repos were from Queensland followed by NSW, Victoria and South Australia. No visitors were recorded from the Northern Territory which incidentally has one of the major sea turtle rookeries in Australia.

The majority of the respondents were visiting Mon Repos for the first time (78%), while the rest (22%) had visited Mon Repos before. Most visitors to Mon Repos came in groups. Amongst respondents, groups consisting of two persons were most frequent, followed by those consisting of 4 persons. Most respondents (78%) said that the main purpose of their visit to Mon Repos was to view sea turtles, 11% said that they wanted to study sea turtles, 9% visited because they wanted to entertain their guests. General tourists considerably outweighed specialists and enthusiasts thus indicating a mature phase in the tourist product cycle suggested by Duffus and Dearden (1990). The majority

of respondents came by private motor vehicle but 12% came by coach. Most respondents learned about the sea turtle attractions at Mon Repos by word of mouth followed by guide books, pamphlets and booklets of QPWS, previous visits, TV and tourist information centres. The importance of the personal recommendation effect is quite apparent.

3.3 Economic benefits of Mon Repos sea turtle viewing to the Bundaberg region

The study has shown that sea turtle-based ecotourism brings significant economic benefits to the Bundaberg region. It was shown that an average respondents expenditure in the Bundaberg region (including Mon Repos) was Aus $ 35.45 per day. Assuming that the expenditure of the 23,485 visitors in the 1999/2000 season is Aus $ 35.45 per day, the expenditure in the area from the visitors who came to view turtles at Mon Repos is Aus $ 835,911. The average number of days spent by visitors who came to view sea turtles is 3.21 days. The total expenditure in the area from the visitors is approximately Aus $ 2.68 million for the 1999/2000 season. However, the entire expenditure by visitors cannot be attributed to the presence of sea turtles in the area. This is because some visitors would have visited the Bundaberg region even without the presence of sea turtles at Mon Repos. Therefore, it is necessary to estimate the local economic importance of sea turtles if sea turtles did not occur at Mon Repos. For this purpose two questions were framed. One question was to determine the number of visitors who would not have come to Bundaberg area if not for the presence of sea turtles at Mon Repos. And the second question was designed to determine the visitors who would have visited the area but would have reduced the number of days in the Bundaberg area if sea turtles did not occur at Mon Repos. From the data obtained it was revealed that the loss of income for the Bundaberg area (within a 60 km radius) for the 40% of visitors who would not have visited Bundaberg area if sea turtles did not occur at Mon Repos was Aus $ 792,581. 17. The loss of income from the number of reduced days if sea turtles did not occur at Mon Repos for the 19% of visitors is Aus $ 175,583.50. Therefore, the total income lost to the Bundaberg area within a 60 mile radius if sea turtles did not occur at Mon Repos on the basis of 1999/2000 season amounts to Aus $ 968,164.54, which is almost Aus $ 1 million. This is the initial income resulting from turtle watching. The income that is generated is significant considering the short sea turtle season and the scarcity of the wildlife that is being viewed. Sea turtle viewing at Mon Repos is, therefore, one of the important economic activities of the region apart from other activities such as whale watching (for approximately 4 months of the year), sugarcane farming, beef production and dairy farming.

3.4 Recreational values of sea turtle viewing

Consumer/recreational surplus of visitors to Mon Repos reflect the satisfaction derived from viewing sea turtles in their natural state. Visitors watch sea turtles when they are nesting and/or hatchlings leaving their nests. Some visitors are able to witness both these spectacles. Consumer surplus shows the difference between what an individual is willing to pay to view sea turtles and the price actually paid. The surveyed visitors' willingness to pay ex post to view sea turtles was found to be greater than the existing entrance fee

charged to view wild sea turtles. It was found that on average, respondents indicated that they were willing to pay a minimum of Aus $ 8.95 for a single adult visit and Aus $ 19.47 for a family visit. These are Aus $ 4.95 and Aus $ 9.47 in excess of the 1999/2000 fees and are indicative of the extent of the recreational surplus from viewing sea turtles. The total recreational/consumers' surplus for visitors from sea turtle viewing in the 1999/2000 season (pensioners' and childrens' ticket holders excluded) is approximately Aus $ 77,722. If the receipts from ticket sales to pensioners and children are added, the total value of ticket sales for the 1999/2000 season is Aus $ 72,728. It is clear that the level of consumer surplus generated by visits to watch turtles exceeds income from fees. The high recreational value from the sea turtle viewing experience is reflected in the fact that a majority of respondents (85%) wanted to return to Mon Repos. This confirms the satisfaction gained at Mon Repos from viewing sea turtles.

3.5 Educational values of sea turtle experience at Mon Repos Conservation Park

Non-consumptive wildlife-oriented recreational ecotourism not only provides economic benefits to the community but also has educational values specially in educating the public on the threats affecting the wildlife that is being viewed. Data collected clearly show that the educational value of sea turtle viewing at Mon Repos Conservation Park is significant. Whilst visitors pay to observe one of natures unique reproductive behaviours they are also educated on the dangers and threats to sea turtles through an interpretative programme while the eggs are being laid and/or the hatchlings are leaving their nests. The display centre and the amphitheatre at Mon Repos were also found to be educational. Of the surveyed respondents, 99% of the respondents thought that sea turtle viewing at Mon Repos was informative and educational. Apart from educating the visitors on the threats facing sea turtles, the experience at Mon Repos influenced the respondents to be more careful with the disposing of plastics, fishing gear, switching off lights near beaches, while overseas refraining from buying/consuming tortoiseshell products, eggs, meat, soups, and using beaches used by nesting sea turtles. Sea turtle viewing also convinced the visitors about the urgency of protecting/taking action to conserve sea turtles in Australia and elsewhere. It was clear from the survey that if not for the sea turtle viewing experience at Mon Repos, the threats facing sea turtles and the urgency to protect them would not have been known by the general public whose cooperation is vital if conservation measures adapted are to be successful.

3.6 Conservation appreciation of the sea turtle experience at Mon Repos Conservation Park

Apart from the educational values, sea turtle viewing also has conservation values. Because of the first hand encounters with sea turtles and/or hatchlings the task of demonstrating the plight of sea turtles and the plight of saving them becomes more effective. Data collected from the survey revealed that the majority of respondents were convinced that more action should be taken to minimize threats to sea turtles. It was revealed that the desire to protect sea turtles increased after visiting Mon Repos. It was also found that after the visitors' experience at Mon Repos, visitors were more likely to report the sightings of sea turtles, injured, poaching or mistreatment of sea turtles.

3.7 Economic valuation analysis

The contingent valuation analysis was used to determine how much the respondents were willing to pay to protect sea turtles that come to nest in Australia. Of the 519 usable survey forms used in the analysis, 374 respondents answered this question. 285 Australians answered this question, while the rest were foreign visitors. There were 71 zero bids and 33 protest bids. Those who gave non-zero bids (268) were willing to pay Aus $2.49 on average a week to protect sea turtles in Australia. When the 71 zero bids are included, the average amount the visitors are willing to pay was Aus $ 1.97 per week. On average, foreigners were willing to pay a slightly higher figure for sea turtle conservation than Australians. This may be due to the favourable exchange rate enjoyed by many foreign visitors to Australia, especially those from the U.K and North America. It can be inferred that the visitors to Mon Repos for the 1999/2000 season involved in sea turtle viewing would be prepared to pay at least Aus $250,000 per year to protect sea turtles in Australia.

3.8 Policy implications

The study shows that sea turtle-based ecotourism at Mon Repos provides economic benefits to the Bundaberg region. Considering the short season and the scarcity of the wildlife that is being viewed, the income generated is significant. The economic benefits from sea turtle-based ecotourism is not only useful for the further development of such nature-based activities in other parts of Australia but is also useful to develop political support for the conservation of sea turtles. The demand for sea turtle viewing indicates that sea turtle ecotourism may have economic potential for expansion and development in other parts of Australia where sea turtles are found especially in the Northern Territory and Western Australia. Sea turtle-based ecotourism can be complemented with Aboriginal and Torres Strait Islanders cultural attractions in some areas. The economic estimates also demonstrate the existence of the opportunity cost of the incidental destruction of sea turtles (e.g. from boat strikes, entanglement in prawn trawls, crab pots) and current consumptive uses (e.g. meat and eggs). Given the opportunity costs involved in such activities it may be appropriate to apply economic instruments to improve conservation management of sea turtles and justify legal sanctions. The economic benefits of sea turtle viewing may be used to help justify the mandatory use of sea turtle excluder-devices in prawn trawls, reducing boat speeds, imposing fines on the disposing of fishing gear and plastics, creating safe sea turtle zones (especially during the nesting season) and sanctuaries. Furthermore, sea turtle based ecotourism provides a strong argument for intergovernmental efforts to curb the large scale harvesting of eggs, meat and tortoiseshell trade in neighbouring countries. The study also revealed that a considerable percentage of responding visitors said that their visit to Mon Repos influenced them to contribute more money for sea turtle conservation than before. This can also be expected to translate into political support for state programmes for the conservation of marine turtles.

Threats affecting sea turtles affects the sustainability of sea turtle-based ecotourism. The sustainability of tourists depends on the extent to which sea turtle populations visiting a beach are maintained. If sea turtle numbers decrease then visitor numbers could also decline (Tisdell and Wilson, 2001, forthcoming). The experience from Mon Repos demonstrates that nature-based tourism activities such as sea turtle viewing provides educational and conservation benefits that are vital for the conservation of wildlife.

Another economic benefit from conserving sea turtles in Australian waters is the pleasure which it gives to scuba divers who swim with sea turtles, for example, in the Great Barrier Reef Marine Park. This aspect has not been investigated in the study but it also has economic value given the importance of scuba diving for tourism in Australia. In addition, many tourists derive pleasure from seeing sea turtles (from boat or land) swimming in the water. Sea turtles, therefore, provide on-site and off-site recreational benefits as well as having optional, bequest and existence values. It is possible that when these values are combined, they are greater than the consumptive values of sea turtles.

CONCLUSIONS

The main objective of the study was to provide economic estimates of the value of sea turtle-based tourism and to estimate the economic potential for the development of such tourism in Australia. The study also determined the educational and conservation values of sea turtle-based tourism. Mon Repos was the centre-piece of this research. In addition to determining the economic, educational and conservation values of sea turtle-based ecotourism, the study provided background material on non-consumptive recreational values of wildlife resources with comparisons, sea turtles as an asset for tourism, the Australian status of turtles, threats to their populations globally and general aspects of the problems associated with the sustainability of non-consumptive wildlife tourism, especially sea turtle-based tourism. This information was provided in Annexure B of Chapter 1.

Sea turtle-based ecotourism at Mon Repos provided significant economic benefits to the Bundaberg region. If not for the presence of sea turtles at Mon Repos, the los of income to the region (within a 60 km radius) is close to a million dollars a year. The income generated is significant considering the short sea turtle season and the scarcity of the wildlife that is being viewed. Sea turtle viewing at Mon Repos is, therefore, one of the most important economic activities in the region, apart from other activities such as sugarcane farming, beef production and dairy farming. The study also showed that the recreational value to visitors from sea turtle viewing is high. The surveyed visitors' willingness to pay ex post to view sea turtles was found to be greater than the existing entrance fee charged to view wild sea turtles. The high level of recreational surplus shows the satisfaction obtained by those viewing sea turtles at Mon Repos. This is further reflected by the fact that the majority of the respondents (85%) wanted to return to Mon Repos. In addition, the study showed that the Mon Repos sea turtle ecotourism provided an educational experience and imparted a conservation message to visitors.

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APPENDIX I

PUBLICATIONS FROM THE AUTHORS IN RELATION TO THIS RESEARCH PROJECT

Tisdell, C. and Wilson, C. (2001, forthcoming). Developing Ecotourism for the Survival of Sea Turtles, *International Journal for Sustainable Development* - Special Issue.

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